This Issue: Important Progress in California Electrical Cooperative Campaign Movemen

JOURNAL OF ELECTRICITY

VOL. 41 NO. 9 SAN FRANCISCO, NOVEMBER 1, 1918 PER COPY, 25 CENTS

Will you help to put over the California Cooperative Campaign?

We believe that every man in California who sells electrical supplies—whether dealer, contractor or central station—will be serving the best interests of the industry by carrying out the plans of the Association.

The California Association of Electrical Contractors and Dealers is now asking the cooperation of all its members in putting over an aggressive, educational campaign to teach the public just how to use electricity to best advantage.

The advertising propaganda of the California Cooperative Campaign is based on the suggestions of Governmental Departments, and is strictly a war time measure. By this Campaign the Association is trying to do these two things:

—***first,*** **it hopes to educate you men in the electrical industry to a better understanding of how electrical appliances will help to win the war by conserving fuel, food, time and labor, and by showing you when and where to sell appliances.**

—***second,*** **the Association hopes to get your cooperation in educating the public along the same lines by running a series of advertisements in your local newspapers.**

PERIODICAL

And we, as manufacturers, take this opportunity to register our approval of this action on the part of the Association. It is in line with what we are doing in a national way—see our ad in the Saturday Evening Post of October 5th on page 2.

If for any reason you are not fully acquainted with the California Cooperative Campaign now being launched by the Association, we suggest that you write to Secretary Redpath, Rialto Building, San Francisco, for a set of the advertisements and full instructions.

GENERAL ELECTRIC DIVISION

Edison Electric Appliance Company, Inc.

Ontario, Calif. Chicago New York

Gages That Pass Every Inspection

Accuracy Checked to .0001.

That tells the story of a new grinding standard—of finer tools—of lowered costs—of greater production. In every field there is some one tool of acknowledged leadership. In the portable grinding field it is the **DUMORE**.

Mechanics call for **DUMORE** grinders, in their specifications because of the tool's reputation for service and satisfaction. Its mechanical perfection is assured by the dynamic balance of all revolving parts and by the speeds ranging from 10,000 to 50,000 R. P. M. Chatter marks, taper or bell-mouth are unknown in shops equipped with the **DUMORE**.

The secret of obtaining high-grade gages, jigs, or dies does not necessarily rest in costly, heavy machinery. The **DUMORE** grinder offers you a positive solution to the problem. Your jobber will be glad to show the tool, or an inquiry to us will bring full information.

WISCONSIN ELECTRIC CO.

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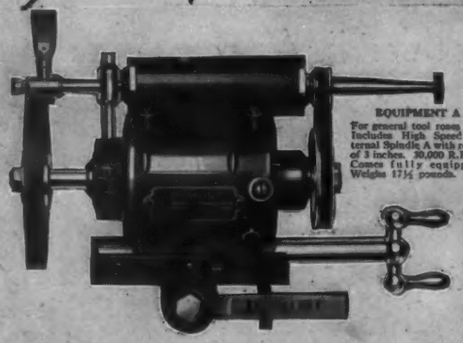

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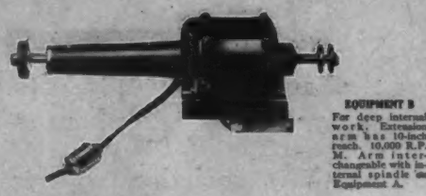

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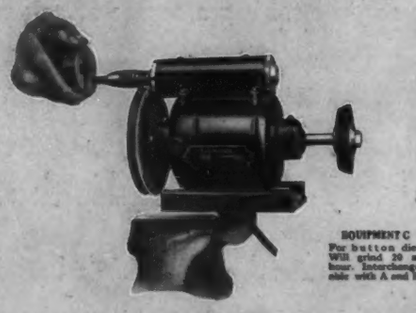
For deep internal work. Extension arm has 10-inch reach. 10,000 R.P.M. Arm interchangeable with internal spindle on Equipment A.



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For button dies. Will grind 20 an hour. Interchangeable with A and B.

DUMORE HIGH SPEED GRINDERS

JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor — CLOTILDE GRUNSKY, Associate

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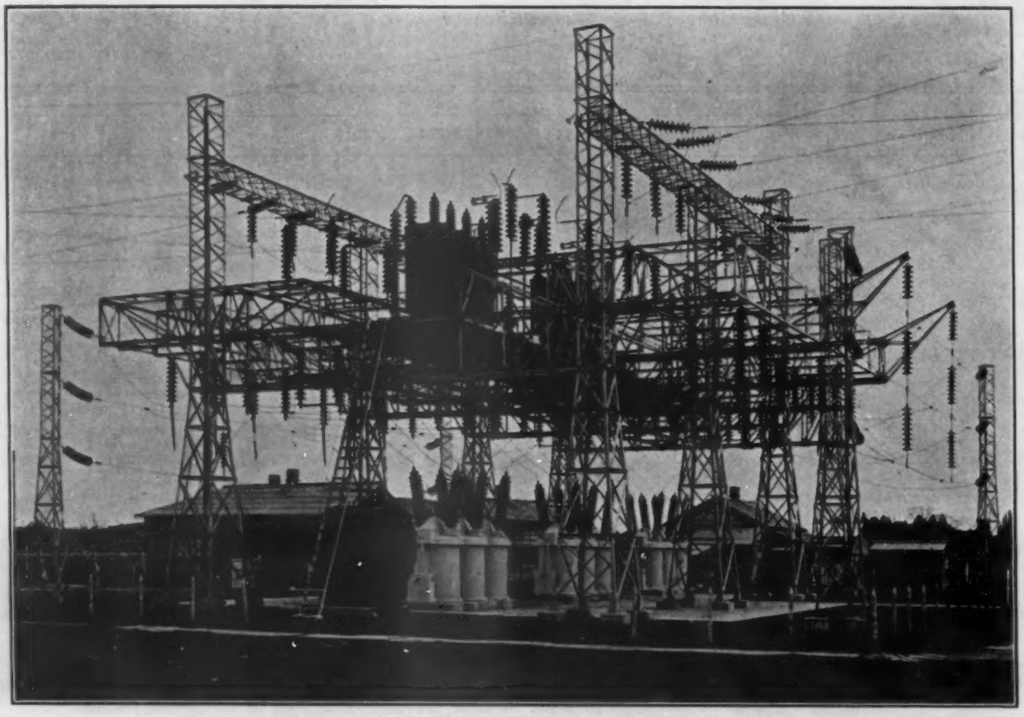
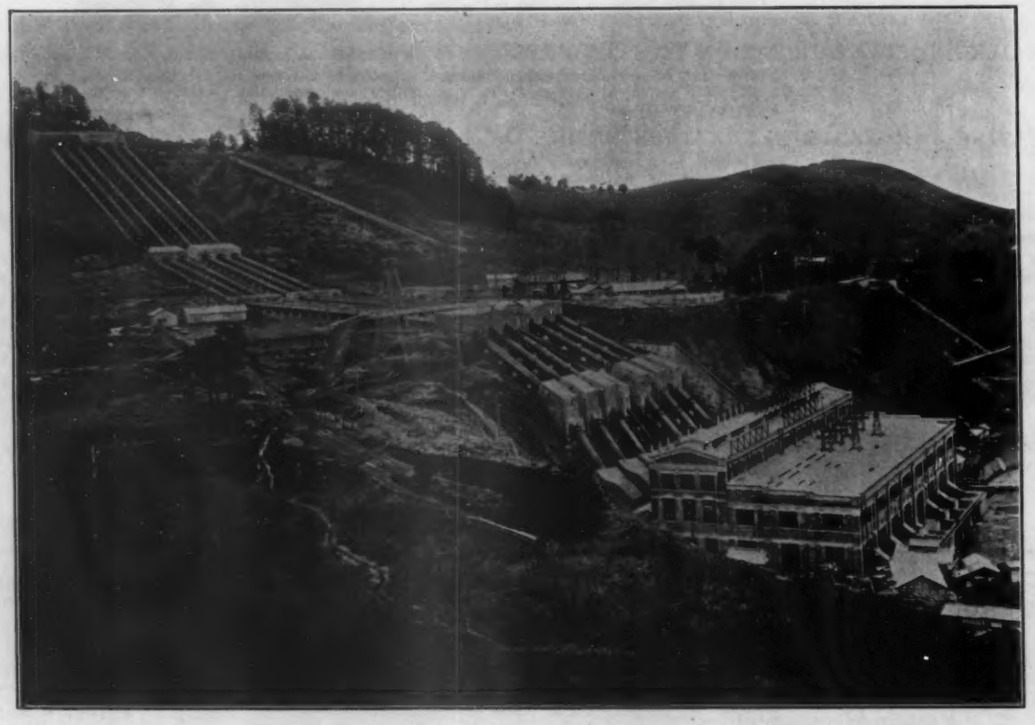


ELECTRICAL ENTERPRISES IN JAPAN

Men of the electrical industry in the West view with increasing pleasure and interest the magnificent development in the method electrical that is under way among our Pacific neighbors of the Far East. Up to April, 1918, Japan had 597 electric-power supply companies with a total capitalization of $181,000,000. The outdoor switching station and other constructive features of the 115,000 volt line of the Inawashiro Hydroelectric Power Company—views of which are shown on this page—constitute new and important advances in electrical engineering triumph and illustrates the up-to-the-minute progress of electrical development in Japan.



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JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 41 SAN FRANCISCO, NOVEMBER 1, 1918 Number 9

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You have only to stop and recall the last letter you received from your pal at the front with the strong endorsement of the Y. M. C. A. service it contained, to move you to give to the utmost within your power during the forthcoming National Campaign for furthering this great and noble work.

Twenty Million Dollars in New Development

The great war need for additional electric power in northern and central California and the necessity for active local support of his definite recommendations to the War Industries Board were emphasized by Major George F. Sever of the U. S. Army Engineer Corps, at a recent meeting of the San Francisco Electrical Development League. When introduced to the 150 representative electrical men present by President H. F. Jackson of the Sierra & San Francisco Power Company and John A. Britton of the Pacific Gas & Electric Company, Major Sever quoted from President Wilson and Secretary of War McAdoo to show their realization of the urgency of new power developments. These are needed not only to supply present power requirements but also to release fuel oil for use of shipping after the war.

Major Sever's recommendations to Washington call for the development of 127,000 kilowatts during the next three years, involving an expenditure of twenty million dollars. This includes 21,000 kilowatts on the Stanislaus River by the Sierra and San Francisco Power Company, 25,000 kilowatts on Bear River by the Pacific Gas & Electric Company, 40,000 kilowatts on the Feather River by the Great Western Power Company and 32,000 kilowatts on the Pit River at Sheep Rocks, near Kennett. The remainder is made up of emergency steam installations at San Francisco and Oakland to tide over the present crisis.

Men of the electrical industry in the West view the able work of Major Sever with outspoken admiration. He came to the West unheralded and unannounced, yet by the very straightforward and thorough manner in which he has himself made his own personal observations in the field and drawn his own personal conclusions he has won hearty support and endorsement from every quarter.

It would seem that this able public servant will accomplish shortly what almost a generation of Western effort has failed to bring about in Congress —a fuller realization of the immediate need for development of hydroelectric power freed from governmental entanglements that have hitherto prevailed.

Fuel Oil for the Emergency Fleet

One of the interesting side-lights of recent recommendations made to the War Industries Board through Major Sever is that pertaining to steam electric development. While hydroelectric power is supposed primarily to be developed to save fuel oil, due to the present status of development in California, a recommendation of some 9,000 kw. in steam turbine and boiler equipment has been made to save hydroelectric power. Of the total program calling for 127,000 kw. during the next three years — 118,000 kw. in hydro and 9,000 kw. in steam—it is estimated that by the end of this period 50,000 kw. of hydro-electric power can be used to conserve a similar output of steam power and thus effect a saving in fuel oil for use in operating the emergency fleet. While such a saving is small when compared to the gigantic total of 80,000,000 barrels of oil necessary to operate the emergency fleet, still it is a move in the right direction.

New Electrical Development in Japan

While hydroelectric and steam electric development here on the Pacific Coast has during the past year been practically at a standstill, in Japan the conditions have proven far the reverse.

Statistics compiled by the Japanese Department of Agriculture and Commerce in the month of April of the present year show that

almost 16% of Japan's hydroelectric and steam electric power development took place during the twelve months prior to that time. The total water power development completed was 416,385 kw. with uncompleted projects under way amounting to 317,131 kw. Similarly the steam electric power showed completed projects to the amount of 118,968 kw. and uncompleted of 158,754 kw.

In comparing this vast power development program of 1,011,243 kw. with the completed and uncompleted program of the year previous it was found that the current year shows an increase of 156,330 kw., of which 73,184 kw. is for water power and 83,146 kw. for steam power development.

The total number of electrical enterprises including power and railway is 687, representing a capitalization of about $365,000,000, which compared with the same date of the previous year shows an increase of 39 enterprises with a capitalization of $32,595,000.

Such healthy statements as these augur well for the future financial and industrial development of Japan.

From a technical standpoint, too, these new projects are contributing strength and originality to the progress of the art. An idea of the magnitude of some of these enterprises may be gleaned from a statement of three typical power installations of The Tokio Electrical Light Company, The Inawashiro Hydroelectric Company and The Ujigawa Electric Company, the first two supplying Tokyo and the last the great industrial center of Osaka, as follows:

	Capacity (kw.)	Max. Voltage.	Distance (miles).
Tokyo Light No. 2	35,000	55,000	50
Inawashiro No. 1	35,000	115,000	140
Ujigawa	25,000	66,000	30

The financial and technical importance of all this splendid new development in the Pacific area can hardly be overestimated. Great optimism is felt for the future with the ever increasing growth of the method electrical in the countries bordering the Pacific.

Inter-Company Assistance

The progress of interconnection has extended beyond the bounds of mere physical joining of companies engaged in generating power throughout the West. A much deeper, fuller development is now growing apace.

The recent resolution of the engineering committee of the Pacific Coast Section, N. E. L .A., wherein an effort is to be made to have the specialists of one company available for service in neighboring company organizations is quite in accord with the spirit of the times. Turbine bladers, substation repairmen and a number of other highly specialized workers could, indeed, with much profit to all concerned be loaned from company to company.

Added to the fact that these workers can not be fully employed except in the larger companies and therefore are unavailable at present for the smaller member companies, there is always a breadth of experience to be gained from this enlarged field of effort.

Such practice as this is one of the very desirable features that accrue from membership in such organizations as the Pacific Coast Section N. E. L. A. and the Northwest Electric Light & Power Association, and it is to be hoped that full advantage will be taken of the opportunities thus afforded.

The Value of the Economic Commission

The Journal of Electricity is the one technical magazine in America that is devoting a considerable part of its editorial activity toward developing an ever increasingly more friendly and helpful spirit of internationalism among all the countries that border the Pacific—especially Australia, Japan, China, Siberia and other countries of the Far East. Its editorial columns pertaining to commercial and engineering advance in these countries teem with first-hand discussions of problems of vital interest to all engaged in enterprises of the Pan-Pacific area. As a consequence it feels a peculiar interest in any discussion that may lead authorities at Washington to send an economic commission to any countries of the Far East.

There has perhaps been no single act that has received commendation more generally from the public than that of the Committee on Public Information in its efforts to dissolve the Mexican situation by bringing to this country a number of prominent Mexican editors to see for themselves conditions here in this country and go back to their own people and make their own report.

In the West the work of Fedor Foss, a member of the Russian Special Mission and a representative of the Russian Ministry of Commerce and Industry, has also been peculiarly helpful in giving a clearer perception of the present status of Russia, her aims and life ideals.

There is unquestionably a present day yearning throughout the West to know the Russian situation better by first hand knowledge. Undoubtedly this same feeling is being experienced in other parts of the country at large. There is no question but what this section of the country yearns to be of service in the economic rehabilament of Russia and in the development of Siberia.

An economic commission, carefully selected with proper balance in its composition, would undoubtedly meet the widespread approval of the public generally. To men of the electrical industry in the West the vast water power possibilities of Russia are especially interesting.

Here in the West statistics show that electricity in the homes, in agriculture, in the mines and in the industries is used to a degree that is four times the per capita consumption of the remaining portion of the nation.

With undeveloped water power resources in the West equal to twice that of the total remaining portion of the nation, the West sees in Russia, and especially in Siberia, water power possibilities akin to her own.

The hope is expressed in many quarters of the West that an economic commission be sent to Russia when the time seems opportune and that representation be given looking to helpfulness in economic development of Russia's vast water powers.

Electrical Christmas Gifts

The government has asked that useful gifts only be purchased this year for Christmas. Those of us who have noted the wonderful advance in electric appliances and their real war service in saving the labor about the home need no second reminder that the gift electrical is the one above all others to be sent to friends and relatives this year. But, although we know this select information, do our friends know it?

And then there are the boys at the front. With a ban on all Christmas boxes except one from the nearest relative and little chance of delivery if mailed after November 1st, there are many who have regretfully given up the sending of a holiday gift. But if boxes of goodies are barred, magazine subscriptions are not.

The editorial staff of the Journal of Electricity have been deeply touched by the sincere letters of appreciation that have come back from France concerning copies of the Journal of Electricity that have been sent to boys who formerly were connected with the electrical industry of the West. They are all hungering and longing for more news of men and things with which they are so familiar. We cannot supply the demands from our limited resources. Would it not be an excellent suggestion to order up a year's subscription of the Journal of Electricity as a Christmas gift to some man you hold dear who is now fighting in France?

The Strength of a Composite Organization

One of the greatest helps in the upbuilding of the electrical industry is the regular convening of a centralized organization in each distinct community throughout the West for the exchange of ideas and the mutual betterment of the industry as a whole.

Such an organization should have no outside affiliation nor should it preponderate in any particular grouping of membership. When thus built up a most helpful forum for open discussion in affairs pertaining to the betterment of the industry is then made possible.

In view of this fact it is interesting to analyze the membership of at least one such organization in the West, that of the San Francisco Electrical Development League.

This organization is composed of about two hundred men prominent in the electrical industry throughout the San Francisco Bay region and its meetings on Wednesday noon at the Palace Hotel are always well attended. In the list of members may be found representatives of ten central stations which make up about 25 per cent of the organization. Manufacturing houses are represented to the extent of 40 per cent, jobbing houses 10 per cent, contractor-dealers 15 per cent and miscellaneous representatives 10 per cent.

In all there are about ninety different organizations represented. A central station leads in individual representation, followed by two large manufacturing concerns, and these by two jobbing houses which in turn are followed by two central stations.

Practically every phase of war service has come up for action during the past year and this splendid repersentative gathering has done much to give balance to unified action in the industry throughout this important section of the West.

The support of such organizations in every important center of the West is to be commended, and it is to be hoped that the forthcoming season will see many such organizations carrying on helpful work in the various districts of the West.

Enlarged Usefulness for the Engineer

More and more there is being felt among the engineering profession at large a growing sense of yearning to be of higher and more effective usefulness than in the past.

To show the extent to which this feeling has become world wide an excerpt from a recent editorial in the Denkinotomo (The Electrician's Friend), published in Tokyo, Japan, is interesting and instructive:

> The extension of engineers' activity from purely technical to social, financial, and executive services has been a growing sentiment among thinking engineers. The social position of engineers has been far from ideal, perhaps, farther from that in Europe and America. The prejudice against engineers has been proverbial and has proved a stumbling block to the advancement of industry and technology in Japan. The advancement in social position and the extension of engineers' services from the present narrow limit of pure technology to more extensive circles has begun to be a new slogan among certain enthusiastic members of the engineering profession. A new organization termed "Kosei-Kwai" (Engineering-politics Society) has recently been organized which declares as its purpose to improve the present state of industrial organization and administration, to promote technical education, to investigate and discuss important national questions so as to lead the public opinion and to move the national government. Many prominent engineers have enthusiastically enlisted to the new institution, and it is hoped that the institution will fare well and fulfill its declared duty for the best of the country and for itself.

While in America the status of the engineer has been accorded the highest recognition in social circles, still the usefulness of the engineer as a civic agency is still hampered and limited.

This is largely the fault of the engineer himself in that he has so often considered that his work ceased at the completion of the technical details of the problem he had at hand.

The vast world problems now to be settled largely concern problems of finance, of economics and humanitarian cooperation and helpfulness. Here, then, is a brilliant new field of endeavor open to the engineer, with his trained analytical mind, to be of utmost service in the great reconstructive problems now before the world. The opportunity is a big one and it is believed the awakened vision of the engineer is fully equal to the emergency.

THE NEW JOURNAL SERVICE: Economy in the use of fuel is still the cry of the hour. A new series of articles will begin in the issue of the Journal of Electricity for Nov. 15, 1918, on "Saving the Waste in the Chimney." Little has previously been published on this most important subject in the West, where oil is used as a fuel. The elementary mathematical theory of the chimney draft will be set forth in this series and workable formulas deduced for size and height of stacks for sea-level and any altitude above sea, for oil-fired power plants. A great number of practical suggestions for increasing chimney economy will be given. The writers of this series are Robert Sibley and Charles H. Delany, authors of a recent book on "Elements of Fuel Oil and Steam Engineering." Helpful suggestions from the Fuel Administration, especially compiled for Western needs by the technical staff of the Fuel Administration, will also be placed in this department.

INDUSTRIAL CONDITIONS IN JAPAN

BY J. R. GEARY

(Japan is not only one of America's greatest rivals in Oriental trade, but one of her best customers as well. The development of Japan industrially and particularly along electrical lines is here described by one who as representative of the General Electric Company in Japan for the past fifteen years, has done much to maintain the cordial relations existing between the two countries.—The Editor.)

Conditions in 1914 —

In briefly discussing the present industrial conditions of Japan, I wish to call attention to what existed at the commencement of the present war in 1914. At that time there was considerable depression in the industrial circles somewhat along the same lines as really existed in the United States and some other countries. Shortly after the war commenced, and when it became difficult for various neutral and other countries to obtain what they desired from the sources of supply previous to the war, their attention was directed to Japan and as a result orders were placed in Japan by South America, Australia, New Zealand, Russia, and also large orders from the United States and England.

A great variety of manufactured articles were desired by these various countries, some of which Japan had not previously made and therefore were not experienced in producing. Japanese engineers and business men were therefore dispatched to various countries in an endeavor to learn all possible respecting these various lines of manufacture in order that they might take advantage of the opportunities offered for increasing the output of the Japanese factories. This has really continued up to the present time with the result that the total exports of Japan have increased enormously. For example: In the year 1913 imports into Japan from all countries amounted to approximately $365,000,000 in value. The exports amounted to approximately $316,000,000, thus showing excess of imports amounting to $48,000,000.

Japanese Foreign Trade —

In 1917, three years afterwards, the exports amounted in value to $800,000,000 and the imports to $517,000,000, thus showing an excess of exports, or the balance of trade in favor of Japan, amounting to $283,000,000. You will see, therefore, that the increase in imports amounted to 42%, while the increase of exports amounted to 153%.

The total value of Japanese exports to China alone during the year 1917 amounted to $145,000,000, which is an increase of approximately $58,000,000 over the previous year. The imports into Japan from China during that same year amounted to $56,000,000, which is an increase of approximately $10,000,000 over the previous year.

This, of course, will give an idea of the progress of the manufactures in Japan during the first three years of the war.

Investments Abroad —

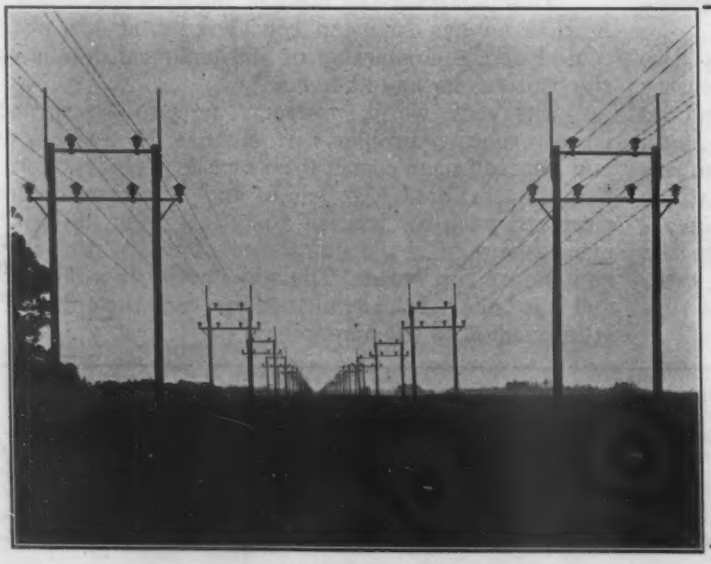
As showing also the prosperity of the country, I would like to mention the cash investments made by Japan in various countries during the same period. From the commencement of the war up to the end of 1917, namely, about 3½ years, Japan invested $377,000,000 in outside countries. $267,000,000 of this is represented by government investments in foreign bonds and $40,000,000 cover investments in China. The investments in China are distributed about as follows:

Currency Loan,
Loan granted for Electrical Enterprises,
Loan to cover Telegraph work,
Loan negotiated for Railway and other work.

Japan also has investments in Manchuria aggregating $250,000,000.

The Electrical Business in Japan —

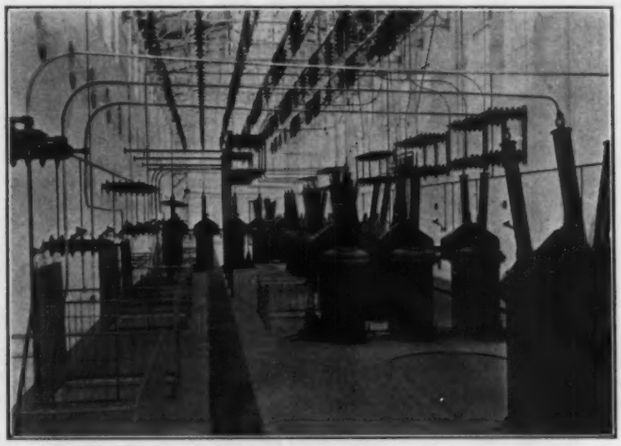
You will be interested in the progress of the electrical business in Japan during the fifteen years that I have resided in that country, representing the interests of the General Electric Company there. Remarkable work has been done on all classes of electrical undertakings, in addition to the manufacturing



The high tension transmission line of the Tokyo Electric Light Company near Tokyo, Japan. The total capital invested in electrical enterprises in Japan, outside of manufacturing companies, amounts to approximately $730,000,000. The capacity of the water power plants is about 730,000 kw. and of steam plants 277,000 kw.

plants which have been established and which now turn out practically all classes of electrical apparatus, following very closely along the lines, but of course in a much smaller way, of progress of the electric light and power companies and electrical manufacturing concerns of this country.

There are at present about forty miles of electric railways in Japan. The total capital invested in electrical enterprises, outside of manufacturing companies, amounts to approximately $730,000,000. The capacity of the water power plants is some 730,000 kilowatts, and of the steam plants 277,000



115,000 Volt Oil Switches for the Inawashiro Hydroelectric Power Company near Tokyo, Japan

kilowatts, making a total operating capacity in Japan at the present time in electric plants of approximately 1,000,000 kilowatts.

The largest electric light company there is the Tokio Electric Light Corporation, which is operating approximately 100,000 kilowatts in water power apparatus. In all the other large cities and in a great majority of the smaller towns electric light companies exist of the size proportionate to the requirements of the place.

The Growth of Home Industry —

Up to five years ago practically all of the electrical apparatus used in Japan was imported either from America or European countries, 90% of which came from the United States. Gradually electrical manufacturing has increased to the extent that up to the present time generating apparatus of as large as 7000 to 8000 kilowatts can be turned out in one of the largest factories there in a period of six to seven months. All of the electric lamps used in Japan are made in that country, and a considerable number are being exported from Japan to other countries. In a few years more practically no electrical apparatus will be imported into Japan by reason of the ability of the Japanese plants to not only turn out all of the requirements of the country but also undoubtedly to be able to export to other countries.

The General Electric Company, as I think you all know, has participated to a very large extent in the electrical business and electrical development in Japan. Previous to manufacturing there, the General Electric Company exported large quantities of apparatus from this country, beginning as far back as 20 years ago. After that time the General Electric Company made certain investments in electrical manufacturing plants there and at the present time has a large interest in the most important electrical manufacturing enterprises with the connection of financial interest and partnership extending over 15 years. This connection has been of the most satisfactory nature, both as regards the investments and the business association with its Japanese partners of that country.

Water Power Development —

Water power development has progressed very rapidly; one plant, for instance, developing approximately 100,000 horsepower at 100,000 volts and the power being transmitted 100 miles.

The Japanese Government electrical engineers have been studying very closely, during the past couple of years, high speed electric railways; several of such engineers having visited and investigated the most important plants of that nature in the United States. There is no doubt that within a reasonable time a large section of the Japanese main line government railway will be converted to high speed electric traction.

The Shipping Industry —

The shipping industry of Japan is a very important one as you probably know that country is building for the United States 500,000 tons of shipping. A part of this business was arranged between the two governments on the basis of the United States supplying a certain amount of steel for each ton of shipping manufactured in Japan for the U. S. A. Subsequent to that arrangement the Emergency Fleet Corporation placed an additional contract with Japan for ships amounting to $100,000,000. Altogether, as stated, the ships already delivered and being built for this country aggregate 500,000 tons.

There are approximately 100 dock yards in Japan, each capable of turning out ships of over 1000 tons capacity. At the present time the annual capacity of Japan in ship building is about 600,000 tons.

In 1914 Japan built 136,000 tons of shipping; in 1916 this increased to 200,000 tons, and during the year 1917 450 ships were built by Japan of the aggregate capacity of 450,000 tons.

The total investment in shipbuilding yards in Japan is approximately $32,000,000. There are 297 Japanese steamship companies engaged in domestic and foreign trade of Japan. The total amount of capital represented by these companies is approximately $135,000,000. This business is very prosperous by reason of the high freight rates enjoyed by them since the commencement of the war, and the great increase of the export business of Japan. Some of these companies have paid dividends as high as 50% per annum during the past year and a half. Five of the large lines have been, for a considerable time, subsidized by the government, but the subsidy has been cut down on account of the prosperity of the companies.

The merchant marine of Japan consists of more than 2000 ships of a total tonnage of 1,500,000. In addition 500,000 tons are chartered from other countries.

WOMEN IN CENTRAL STATION WORK

BY I. W. ALEXANDER

(There are still many who question the adaptability of women to work other than office work in central stations — but in spite of doubts, there are already many young women filling such positions as power plant operators and meter readers with success, as reported in this article. The author is in the commercial department of the San Joaquin Light & Power Corporation. —The Editor.)

The San Joaquin Light and Power Corporation is using women to a greater degree than any other big concern in the valley. The delicate operation of meter testing, which in the past had always been entrusted to the men, is now being done by women almost entirely. Young ladies are doing the meter reading, and are working in the repair shops. In sub-stations and switching stations they are doing

Meter testing as well as meter reading now comes within the province of women. The young woman shown in the picture, Mrs. Violet Chedgey, is attached to the meter department of the San Joaquin Light & Power Corporation and does her work as satisfactorily as any of her male predecessors.

Reading the big meters which record the delivery of natural gas to the Bakersfield steam plant through the new 27-mile line which was placed in commission as a "win-the-war" measure. This gas line will save thousands of barrels of fuel oil daily. As assistant to the superintendent, Miss Morris does all the work which would be expected of a man.

The greatest objection to women meter readers has generally been that they could not be sent into all the places where meters are located. The picture shows Miss Jessie Goodman reading a meter in a pool hall in performance of her duties as meter reader in the Bakersfield District of the San Joaquin Light & Power Corporation. The situation is met with perfect dignity and absence of sensationalism on both sides.

In the big Bakersfield steam plant of the San Joaquin Light & Power Corporation Miss Laurene Morris is now performing the duties of a man, thereby releasing him for service in the army. She is assistant to Superintendent Ace Mendell. Miss Morris is here shown pumping fuel oil from the main storage tank into one of the smaller tanks feeding the boilers. The work is not over cleanly but no objections have been raised on that account by the young lady.

In the shops of the Mongerson Electric Machine Works at Bakersfield a force of six women is doing the work formerly entrusted to men. The photograph shows the overall-garbed feminine workers at the task of winding motors and making reaction coils used in dehydrating machines. This work is particularly important and has a big place in the "win the war" movement of the electrical industry. The dehydrating plants are in use throughout the oil fields for the treatment of emulsified oil, the electric treatment having the effect of separating the oil from the water. This accordingly liberates more oil for commercial uses, thereby cutting down greatly the waste in the fields. Mr. Mongerson is entirely satisfied with his staff of young women workers. They are proficient in every branch of the work excepting the heavy lifting, but there are always enough men on duty to care for the requirements in this respect.

the operating and switching, and doing it well. Their province in the office has been enlarged until they are occupying all the desks with the exception of the highest in authority and heaviest in responsibility. There are no more office boys—girls are doing their work. Whenever there is an opportunity to place a woman where a man had been before, the trial is made and if she succeeds in "getting away with it," there is general elation. Another woman has made good and a man released for more valuable duty.

POWER POSSIBILITIES IN CALIFORNIA

BY F. H. FOWLER

(A most comprehensive survey of power possibilities on the streams of California, indicating plainly where the maximum development has already been reached, the drawbacks of certain localities and the advantages of others. The author, who was district engineer for the forest service and intimately in touch with this situation, is now a Captain in the Engineer Corps, U. S. A., on special assignment.—The Editor.)

De Sabla Plant, Pacific Gas & Electric Company.—View taken at the moment of a short circuit, which deflected the stream.

BRIEFLY considering the power possibilities in California, we find that the most important are on the three great river systems draining into the Pacific Ocean — namely: the Klamath on the north, and the Sacramento and San Joaquin, draining respectively the northern and southern portions of the Great Valley. The Klamath cannot be considered an important stream above the point where it leaves Klamath Lake, near the Oregon-California boundary line, and takes its course in a westerly direction through a gap in the Coast Range to empty into the Pacific Ocean near Requa. The stream offers many sites for low head power developments, since its total fall of 4000 feet is rather evenly distributed throughout the 180 miles of its total length from the lake to the ocean. Future developments on the stream will probably be of the type of that already constructed at Copco, where the California-Oregon Power Company has completed its first Klamath River power house, operating under a head of approximately 130 feet. This head, you will note, is insignificant when compared with the 2,000 ft. fall utilized by the Big Creek No. 1 Plant of the Pacific Light & Power Corporation, but the Klamath River has a large and steady flow and in this way makes up to a large extent for its gradual gradient. Ultimately the stream will probably be regulated to a large extent by storage in Klamath Lake, but it is too early to predict what portion of the stored water will be used for irrigation, and what will be available for the generation of power.

Trinity River, the principal branch of the Klamath, heads on the west side of the Coast Range in a region of ample rainfall, as does the Eel River, south of the Trinity. Both streams are, however, of minor importance from a power standpoint, on account of their comparatively small drainage areas and gentle gradients.

Coming southward and entering the Sacramento River drainage we find diverse conditions on the various streams. Pit River, the northern-most of the important power streams of the drainage, has a very large basin in the lava beds of northeastern California, breaks its way through the mountains just south of Mt Shasta, flowing into the Sacramento north of Redding. Water power available on the Upper Pit River is not important, since the gradient of the stream is gentle and the surface flow—due to the porous nature of the country—is but slight when the large drainage area is taken into consideration.

The Upper Waters of the San Joaquin—typical country through which the giant diversion must be effected in order to fully develop the Big Creek Development of the Southern California Edison Company.

Southeast of Mt. Shasta, however, the Pit River receives the flow of some very important spring-fed streams, and below these tributaries has a large and unusually regular flow. The discharge at Big Bend power site—which will be covered with more detail at a later point in this paper—has not dropped during the lowest years of record below 2,500 cu. ft. per second. The fall in this portion of the stream is also larger than in the lava-bed country to the eastward. The total head at Big Bend is nearly 900 ft., and below that point there are several sites which will probably be occupied eventually by plants deriving most, if not all, of their head from high diversion dams.

South of Pit River we find the long sloping lava flows on the west side of Lassen Peak drained by

Cow and Battle creeks and their tributaries—now pretty well occupied by the various plants of the Northern California Power Company Consolidated. South of Battle Creek are Mill and Deer creeks, which offer moderate power possibilities, of the same general type, as those already developed on the Battle Creek watershed. South of Deer Creek we come to Butte Creek, already developed by four plants of Pacific Gas & Electric Company.

The Feather River

South of Butte Creek we reach the Feather River watershed, which contains some of the most important power possibilities in California. Of the three branches of the stream—North, Middle and South Forks—North Fork is the most important from the power standpoint. It heads on the south slopes of Lassen Peak in a lava country, and is fed by extremely large springs in the vicinity of Big Meadows. Many of the readers have doubtless visited the beautiful country in the vicinity of the Meadows and are familiar with the great reservoir, Lake Almanor, which has been formed by the dam constructed by the Great Western Power Company. The present dam has but partially utilized the storage facilities, and, when raised will impound 1,250,000 acre feet of water, giving complete regulation of that portion of the stream. Below the reservoir the stored water, as well as the natural flow of lower tributaries, can be utilized through a series of six plants with a total fall of nearly 3,600 ft. The most important of these developments—that is, the one utilizing over 1900 ft. head immediately below the reservoir—will be covered in detail later.

Proceeding southward with our survey we find that the Middle Fork of Feather River flows through a deep canyon, has rather moderate gradients, and does not, under present power conditions, offer a very promising field for hydro-electric development. The South Fork has a smaller watershed and is also unattractive.

Yuba River Developments

Yuba River and its various tributaries would rival the North Fork of Feather River in importance as a source of power were cheap storage sites available, since the rainfall on portions of the Yuba watershed is as bountiful as anywhere in the Sierra. Storage is, however, decidedly expensive. The North Fork of the Yuba River is used—without storage—by the Colgate Plant of the Pacific Gas & Electric Company. On the Middle Fork there are no important power developments. South Fork has been completely utilized by Pacific Gas & Electric Company through storage in many small reservoirs near the headwaters, and in the more important reservoir at Lake Spaulding. The water is diverted southward from Lake Spaulding and is to be used in a system of six plants on the Bear and American River watersheds — three of which have already been constructed.

Other Streams

North and Middle Forks of American River flow through deeply eroded canyons, have moderate gradients, and do not, under present power conditions, offer great attractions to the promoter. On the South Fork of American River there are several fairly attractive power sites as yet undeveloped, and storage in connection with some of these developments can be used through the present plant of Western States Gas & Electric Company. South of the American River we find the Consumnes, a type of Sierra stream which does not head directly on the main divide, but is cut off from it by the headwaters of streams to the north and south. Such streams are practically worthless for power purposes, unless they have large and economical sites for storage reservoirs—since not being fed by melting snows in the higher mountains they go practically dry every year, even when the snow-fed streams, after a series of several years of insufficient precipitation, dwindle to almost nothing.

South of the Cosumnes the Mokelumne, with moderate storage facilities, is utilized by the Electra Plant of the Pacific Gas & Electric Company. Above this point and below the present reservoirs there are several rather attractive storage sites, and opportunity for the installation of another high-head plant.

The Stanislaus River, the next important stream to the south, is already partially developed and plans are completed for the extension of the development on a progressive program. On the North Fork there is a small plant utilizing an old mining ditch system with three small reservoirs. This is operated by the Utica Gold Mining Company for its own supply. Plans are on foot to construct another reservoir of much larger capacity and utilize the increased water supply, not through the present plant but through a much higher head at a point on the main river below the mouth of North Fork. On the Middle Fork the Sierra & San Francisco Power Company has installed its Relief Reservoir and Stanislaus Plant, and on the South Fork the Strawberry Reservoir. The company has also acquired its Phoenix Plant and several small reservoirs constructed in early mining days. The company plans the construction of a reservoir at Kennedy Meadows, and another at Donnells Flat on the Middle Fork, and a second reservoir at what is known as Big Dam on the South Fork, as well as a second plant near the intake of the present Stanislaus development.

On the Tuolumne Watershed

The developments that are to be made on the Tuolumne watershed are already familiar to the readers, through various reports made in connection with San Francisco's Hetch Hetchy water supply. The city proposes to construct two plants, one near Early Intake and the other at Moccasin Creek.

South of the Tulomne we come to the Merced River, which like the Tuolumne flows from the Yosemite National Park. The Merced is cut off from the main divide by the headwaters of the San Joaquin on the south and Tuolumne on the north, although there is one small strip of watershed which barely reaches the higher mountains. The resulting streamflow conditions are the same as in the case of the Cosumnes. In low seasons the river dwindles to insignificant proportions. Its canyon is deeply eroded and its gradients comparatively slight. It is therefore of no great importance as a power stream. It is possible that in future years storage sites in

the Park above Yosemite Valley will be utilized, and we shall then have an increased supply of water over the falls of the Yosemite Valley during the summer season, and will have an opportunity to utilize this water below the valley in the generation of power.

The Importance of the San Joaquin Watershed

The San Joaquin watershed, south of the Merced, is very important in our present power market, since it is the site of plants which supply most of the power used in San Joaquin Valley south of Merced, and a great deal of the hydro-electric energy used in and around Los Angeles. It is interesting to note that the principal existing and proposed developments on the San Joaquin are not supplied directly from the main stream but are located on its secondary branches. This type of development is one which you will find at various points in the Sierra. The attractive feature of the secondary streams is their rapid flow from their headwaters to the point where they join the main river. Big Creek, a tributary of this type, which enters the main San Joaquin from the south, has a drainage area of about 80 square miles above the point where it takes its plunge into the canyon. In past ages the stream has cut through the granite rim of the basin just at this point, so that by the construction of three dams a storage of 100,000 acre feet can be developed. The water thus made available is to be dropped through 5960 ft. head in four plants.

Scenery but Not Power

The next important stream south of San Joaquin is Kings River, which from a scenic point of view is one of the grandest of the Sierra. It is, however, of very little present importance as a source of power, even though its flow is large in comparison with other southern Sierra rivers. This lack of value as a power stream is due to the depth of its canyon—the stream having a decidedly moderate gradient with inadequate storage facilities along its upper course. Several power developments of moderate size are proposed on the tributaries which enter the streams from the north, but sufficient data has not yet been collected to show how attractive these developments will be. Kings River will be far more important as a source of water for irrigation than as a power stream, since a very large reservoir site at Pine Flat in the upper foothills will permit storage for irrigation purposes.

Kaweah and Tule rivers, south of Kings River, have been utilized as sources of power for local distribution in the region from Visalia to Porterville.

They are both cut off from the main ridge of the Sierra by a secondary ridge lying to the westward, and, therefore, flashy in character. They also lack attractive storage sites and cannot be considered of vital importance in the State's future power system. They are attractive on account of their rapid fall and have been quite thoroughly developed by existing plants of the San Joaquin Light & Power Corporation and Mt. Whitney Power & Electric Company.

Kern River Developments

The last great stream finding its way down from the western slope of the Sierra is Kern River—which does not discharge into the main San Joaquin but into the sink in the vicinity of Buena Vista Lake, near Bakersfield. Two important plants have been in operation on the Kern River for many years and there is, in addition, a small plant at the mouth of the canyon. There are four other undeveloped sites on the North Fork of the Kern, between Kern Lake and the mouth of the canyon, which will completely utilize the stream. The South Fork, which drains the eastern portion of the Kern River basin, is not attractive as a power stream, since it has a very light rainfall and is completely utilized for irrigation purposes in the South Fork Valley. The North Fork of Kern River would be of vastly more importance as a power stream if some of the storage sites in the upper river could be utilized, but unfortunately the present Buena Vista reservoir, owned by irrigation interests, is located at the extreme lower end of the stream and its waters have been apportioned to various irrigation interests through Court decrees, after long and bitter litigation. Any development of storage on the upper river would affect the amount of water that could be stored in Buena Vista reservoir, and also the relative rights of the various claimants below the mouth of the canyon. The situation is so complicated that it has been impossible up to the present time to secure any agreement by which such storage could be undertaken. It appears that reservoirs in the upper mountains would obviate a large part of the excessive evaporation loss that takes place at Buena Vista Lake, and would also increase the low flow of the stream so that it would be possible to develop a great deal more power.

On the East Side of the Sierras

The principal power possibilities on the east side of the Sierra are on the Truckee River, although there are minor possibilities on the Carson and Walker rivers and on small streams flowing into the Mono and Owens Lake basins. The most attractive of these sites have already been, or are now in the process of being, utilized.

Various proposed plants along the Los Angeles Aqueduct, and on the small streams emptying into the river above the Aqueduct intake, will form a very important municipal power system; the first units of which have already been put in operation at the San Francisco No. 1 and River Power Station near the south end of the aqueduct. The development of the other plants will be made on a progressive program. There are now in operation the small plants built by the city for construction power purposes on Cottonwood and Division creeks, near the head of the aqueduct.

On the south side of the San Gabriel and San Bernardino mountains, eastward of Los Angeles, the small power streams are already pretty thoroughly developed by some of the minor plants of our California hydro-electric system. Future possibilities in this region are not very important, since these are days of large units, operated in connection with considerable amounts of storage. The Southern California streams are mostly small, with only limited opportunities for development of storage.

TALKS ON THE COOPERATIVE CAMPAIGN

(Perhaps the most complete review of present conditions and problems from the standpoint of the contractor-dealer yet brought together. A review of the talks at the recent California Electrical Campaign dinner at Los Angeles. Brimful of valuable information and invaluable suggestions.—The Editor.)

THE CALIFORNIA ELECTRICAL CO-OPERATIVE CAMPAIGN

BY LEE H. NEWBERT

What the Campaign Is —

During a talk on the origin of the California Electrical Cooperative Campaign L. H. Newbert, Chairman of the Advisory Committee, spoke substantially as follows:

This campaign has for its main objective better electrical service to the public, it being conceded that as a result of that service more profit will come to individuals and companies in the electrical industry. The nature of the campaign is educational. It is not a sales campaign. It is not intended to directly help the dealer-contractor sell more appliances or more electrical service, but it is intended to show him how to make his business larger, better and more prosperous. It is intended to help in a cooperative way the educational work that has been and is being carried on by organizations representing the different branches of the industry, such as the California Association of Electrical Contractors and Dealers, the Electrical Supply Jobbers, Electrical Manufacturers and the National Electric Light Association.

The Aims of the Association —

The contractor-dealers are the natural salesmen of the industry, so why should not the central stations and the other branches of the industry cooperate in their educational work and thereby help the contractor-dealers to become more effective in creating in the public's mind a greater desire for electrical service. The contractor-dealers of California have joined together in their association to cooperate in educating each other, showing how to improve their salesmanship and business methods, all to the end that they may furnish better service to the public, realizing that with superior electrical service comes a greater desire for things electrical, resulting in more work and greater profits for the contractor-dealer.

A Plan for Assisting —

In the conduct of this educational work the Association needed help. This was substantially the idea expressed by a contractor-dealer, a jobber and a manufacturer, who by invitation had the privilege of sitting with the several central station commercial men who formed the first commercial committee of the Pacific Coast Section, N. E. L. A. The central station men on this committee needed no urging. They readily expressed a desire to aid. Other plans of cooperation, such as including bonuses, etc., had been tried in limited sections of our State without much success, and the central station men on the committee were really looking for a practical plan which would enable them to effectively cooperate with the contractor-dealer and the other branches of the industry.

The report of the Commercial Committee to the Riverside Convention contained a recommendation which resulted in the adoption of the following resolution:

"That the member companies of the Pacific Coast Section lend active cooperation and support to the California Association of Electrical Contractors and Dealers, and that a proposed plan be formulated by the Commercial Committee."

The new commercial committee of the N. E. L. A., assisted by the contractor-dealers and the jobbers, carried out the instructions contained in this resolution, and late in September placed before the Executive Committee of the Pacific Coast Section of the N. E. L. A., before the California Electrical Supply Jobbers, and before the Executive Committee of the California Association of Electrical Contractors and Dealers a proposed plan for a cooperative advertising and educational campaign.

The Organization —

The committee includes men from all branches of the industry, and from different sections of the State. It consists of:—

Three Contractor-Dealers,
Three Central Station men,
One Jobber,
One Manufacturer.

To finance the campaign funds were subscribed as follows by:

Central Stations	$5,900.00
Jobbers	3,200.00
Contractor-Dealers	2,000.00
Manufacturers	1,300.00
	$12,400.00

The greater part of the fund is being expended for the employment of two field representatives, who travel throughout the State, calling on central station men and contractor-dealers for the purpose of bringing about a proper understanding of these two branches of the industry, to the end that each may thoroughly understand the problems of the other, and as the result of being fully informed do much more effective cooperative work. The field men are also to point out to contractor-dealers improved business methods, to the end that they may better serve the public.

Mr. A. L. Spring was employed on January 15, 1918, to act as field representative for the campaign in the southern section of the State. Those of you who have come in contact with Mr. Spring know of the good work that he has done. Mr. W. F. Brainerd was employed on March 15, 1918, to act as field representative in the northern section of the State, and has been actively at work ever since.

Policy on Central Station Merchandising —

In answer to several questions that were raised during and after the "Get-Together" dinner in San Francisco the Advisory Committee at its meeting on June 8th framed and adopted the following resolution:

"It is the policy of the Advisory Committee to not ask or urge central stations to go out of or stay out of the business of selling lamps, appliances, etc. at retail to their regular customers. It is, however, the policy to encourage the central stations to conduct their selling of appliances, etc., on an ethical retail basis and with due regard to the interests of the retail dealers of their respective territories. It is also the policy of the committee to help and encourage dealers to improve their business methods and to so serve the public in the retailing of lamps and appliances that a large volume of the business will naturally be given to them. This policy will be followed by the committee to the end that these two branches of the electrical industry may both profit to the greatest extent from the cooperative and satisfactory service to the public."

And at its meeting in San Francisco on August 2nd and 3rd, 1918, the Advisory Committee adopted a further statement of policy, as follows:

To Improve Accounting —

"Our policy is to develop our industry by educational methods, encouraging the practice of good business ethics and methods and of improved service to the public. It is recognized that the practice of proper accounting, of other good business methods and of good business ethics will result in companies and individuals asking for their goods and service a price that will include a fair profit, and we hold that such exchange of goods, service and ideas for profit, is legitimate and ethical, provided that all parties in the exchange, including the customer, are benefited thereby.

It is expected that the adoption of good business methods will also so increase the efficiency of the various branches of the electrical industry serving the public that it will enable our industry to give the customer a better value for the dollar he spends for electrical service."

The field men have not yet taken up questions of accounting practice in the detailed way that the Advisory Committee had planned. The committee made arrangements to secure copies of the accounting systems adopted by the National Contractors' Association, but when about to turn this over to the field men for use by the contractor-dealers in California it was found that the National Association had decided to revise them. It was therefore determined to postpone action until the new system is obtainable, when it will be placed with the contractor-dealers of California by the field men.

Cooperation —

The committee is securing some splendid cooperation from the salesmen of the manufacturers and jobbers. A plan is being prepared by which it is hoped more of their valued support and assistance will be enlisted. **Mr. Salesman: You can do much to assist in this campaign work. Will you not write me and suggest how you can help?**

The committee takes this opportunity of requesting members of the electrical industry in California to send constructive criticism of the campaign work and suggestions for its improvement to the Chairman or to any member of the committee.

We are indebted to the electrical press, particularly to the Journal of Electricity, Electrical Merchandising and Electrical World for the support and publicity which they have given to the campaign. The electrical men in California, particularly central station commercial men and contractor-dealers, are urged to study the campaign by reading the articles which have appeared and will appear from time to time in these leading journals of the electrical industry. A list of the articles which have appeared will be mailed by the committee's secretary, Mr. Redpath, 505 Rialto Building, San Francisco, on request.

YOUR PART IN THE CENTRAL STATION PROBLEM

BY A. E. WISHON

A. Emory Wishon, Assistant General Manager, San Joaquin Light and Power Corporation, spoke on the understanding which the different branches of the electrical industry on the Pacific Coast today have of the direct bearing one branch has to another, or to the industry as a whole. He said in part:

The Importance of Cooperation —

We now know that when one branch of the industry is strengthened that the industry as a whole directly or indirectly benefits, or that if any branch of the industry is weakened that the weakness is reflected in results obtained by the entire electrical industry. For years the trend of the central station has been toward cooperation of central station companies, and to the education of the consumer to a better understanding of the central station problems, by laying all cards on the table, face up.

The success of your business as manufacturer, dealer, contractor or jobber—though you are not a public utility—is directly dependent upon the successful development of the public utility. The public utility problem becomes your problem.

If the central station expands, the electrical manufacturer is kept busy, the jobber is happy and the contractor and dealer prosper.

The Public Utility Problems Yours —

Then why should we not cooperate in an intimate understanding of our individual problems, strengthening our weak places by cooperative council and help, and "go over the top" as the allied electrical industry of the Pacific Coast, fixed in our purpose to develop those wonderful natural resources of this coast—to turn arid plains into fertile farms; to efficiently operate factories; to turn the drudgery of domestic life into a pleasure to the housewife by the introduction of electrical labor-saving devices in every home.

This should be our every-day program in time of peace—but in this time of war, when the boys "over there" are doing their full part, and when as loyal American citizens we are each and every one of us expected to do our full part—what better part can we do than something we know how to do—to develop this now latent hydroelectric power; to transmit and serve it to waiting consumers who by its use produce foodstuffs, save fuels so badly needed elsewhere, speed up factory production and cut down the amount of unnecessary labor required—releasing this labor to where it may be efficiently used in helping to win the war.

The Chance for Development —

We have but touched our hydroelectric development on the Pacific Coast—we have only dotted our deserts with irrigated farms, served by pumped waters—and as our production of foodstufls is increased our factories will increase.

When God built the Pacific Coast, He created the Sierra Nevada Range with its wonderful watershed—He created the fertile valleys of California, underlain with abundant water strata. The Creator figured a hydro-electric set-up from the start. The fall given the limited amount of stream flow was for the purpose of generating hydroelectric power—to lift the underground waters for the irrigation of arid lands—to turn deserts into producing farms and happy homes, and to drive every wheel of industry that must follow: and you were put here, as electrical men, to help put the big scheme across.

Who Shall Develop Power —

Just as the hydroelectric development of the Pacific Coast expands, so shall the entire development of the Pacific Coast increase. I maintain that it is the limiting feature of all business development on the Pacific Coast. Then who shall develop this power?

My answer is—those who have spent their lives in the study of the problem. The rates to the consumer are regulated to protect him, so there can be no argument there.

To develop, however, money is needed, materials are needed, men are needed.

To get money you must issue bonds. These bonds are sold throughout the country to bankers, brokers, merchants, farmers, widows and orphans and to people in all walks of life, and these people are protected in their investment by a "Trust Deed" that provides that the company must earn a certain fair per cent upon its invested capital before additional bonds can be issued for additional development.

Thus, a fair earning must be allowed to be maintained if development is to be continued.

When I say a fair earning, I mean an earning that will allow development under the terms of the Trust Deed—and that is a figure most any private interest would consider suicidal—but which when allowed a company of large capital makes possible a small margin of well deserved profit and makes possible future development.

The Regulation of Water Power —

Another important point is the regulation of water powers. Whether on private or Government lands, water powers are valueless to the public good until harnessed, and it takes money to buy the harness.

With rates regulated by our Railroad Commission and the country's future depending upon hydroelectric development, every encouragement should be offered by the National Government for the development of water powers. But sometimes it is hard for those from afar off and not in touch with our coast conditions to fully appreciate the conditions that govern the financing and development of public utilities, and in their legislative desire to protect government interests they make laws limiting rights and impose conditions that delay financing and resultant development, and thereby keep from the very people they intend to protect their inherent God-intended right of use **now** to the undeveloped hydroelectric powers so necessary to their prosperity.

A Temporary Condition —

As has always been our aim, the problem of the central station at this time is to serve the people to the best of our ability. Today we are doing so, but due to lack of finances, men and materials, we are practically at a standstill.

There isn't any use of your getting "down in the mouth" over this temporary condition—simply understand that the central stations are at work every minute trying to have the Government determine their relative importance as war necessities.

Waiting For Classification —

Our business as a whole is essential. At this time Government men are on the coast with nearly unlimited authority studying the importance of the central stations of this coast in the Government program of winning the war. It may surprise you to know that some of our central station companies will rank 95 per cent war necessities.

It will take a little time to unravel some of the red tape, but not long, for this is in time of war. Then some way, some how, when our importance in the production of foods—in driving necessary factories—in saving fuel and labor is determined, and we are definitely rated as a necessary war industry, orders, finances, materials and men will come and we will speed up in our development and in our war service work, as those other industries have done that have been passed upon by the Government as being necessary to the war program.

This future service, however, will be for war essentials —to business of priority passed by the Government.

In the short interval intervening, study your business on the basis of eliminating all effort toward non-essentials, and double your effort in making your particular business help win the war by doing something essential every minute.

TO UNDERSTAND THE PRIORITY SITUATION

BY D. E. HARRIS

Mr. D. E. Harris gave a very detailed outline of the Priority Rulings, it being to the interest of winning the war as well as to the interest of the public that we have a better understanding of the rulings of the War Industries and Priorities Boards.

The Priority Ruling —

The Priorities Committee through the exercise of priority have endeavored to protect the supply of such products as will be required for direct or indirect war work. Priorities implies purposeful discrimination. Therefore, all priorities are relative when the classifications are based on the relative importance of the particular industry or particular plan involved in the war program, or to the supplying of essential needs. The War Industries Board is endeavoring from time to time to issue a statement of its policies which must command the careful and earnest attention of the business industries of the country.

On March 21st, 1918, the War Industries Board adopted its policy of priority classifications to meet the need of checking the building of unessential industries.

Action by the Manufacturers —

On June 24th a committee representing the manufacturers met with the War Industries Board with an endeavor of offering a pledge covering the sale of their products which would permit them to obtain raw material for further manufacture. This pledge primarily covered the sale of steel products which was approved by the War Industries Board. Judge Parker at this time urged upon the electrical industries the absolute necessity of the conservation of all raw materials and the elimination as far as possible of the use of electrical apparatus and supplies which could be placed in the luxury class or which did not contribute to the winning of the war, or to the general welfare.

Further Steps Needed —

Since this meeting, the manufacturers, through their distributing jobbers, have endeavored to carry out the instructions issued at that time, but due to lack of a definite understanding of the responsibilities expected of each branch of the industry, their efforts have not met with entire success. It was found that some interests were working on the conservation of steel products only and others on the entire lines manufactured by the electrical industry. This resulted in the appointment of a committee of electrical supply jobbers who got together with the War Industries Board and secured the adoption of a definite plan for future operations.

The Present Plan —

The results of this meeting have now been covered in Circular No. 23 dated September 17, 1918, which is as follows:

I.

It is in the public interest that all jobbers, wholesalers, and resale distributors, of, and dealers in, electrical equipment, apparatus, appliances and supplies should be permitted to maintain reasonable stocks from which government agencies, war industries, contractors and the civilian population may draw to meet ESSENTIAL requirements. Such persons, however, should recognize the existing necessity for rigid economy in the use of all such products and their duty to see that such products shall be devoted to ESSENTIAL uses, and they should pledge their whole-hearted co-operation in a program to accomplish such results.

II.

Jobbers, warehousers and resale distributors through their War Service Committee have already obligated themselves to assist in securing such results. They will be permitted to maintain reasonable stocks and distribute therefrom after having executed a pledge to the effect that they would (1) not use, nor permit to be used, any electrical equipment, apparatus, appliances, or supplies, except for essential uses; (2) not make any sales or deliveries from its stocks except (a) such small sales from shelf stocks as are necessary to meet minor needs of the community which it serves, (b) such sales as are warranted by priority certificates or by automatic priority ratings issued or authorized by the Priorities Division, (c) sales of appliances, the manufacture of which has been approved and for whose sale a pledge has been given, or (d) sales to dealers, contractors, retailers, repairmen, or others buying for resale who have filed with the undersigned, a pledge in writing similar to this pledge; (3) in ordering electrical equipment or apparatus, they will furnish the manufacturer information regarding stocks of all makes then on hand and the essential character of the sales made justifying the order placed; (4) that they will use utmost endeavor to reduce all stocks to the minimum consistent with the essential requirements of the territory to be served.

Penalties —

When the Priorities Division shall have approved such pledge, the Electric and Power Equipment section will issue to such jobbers its certificate declaring such jobber to be entitled to avail itself of the benefits of this circular. **This department will revoke the certificate issued to any jobber for any violation of the pledge given by such jobber and will certify such revocation to such jobbers' suppliers and the Priorities Division will withhold from such offender all priority assistance.**

You will therefore appreciate that it is imperative that we live up to our obligations, fulfilling our pledge, or be practically barred from continuing our operations. To successfully carry out the terms of our pledge, we must have the support of the electrical dealers and contractors or others engaged in the merchandising of electrical materials, and it will therefore be necessary that these interests be brought within the limits of this pledge, and at the request of the Priorities Committee each dealer will be required to execute and sign with each of its suppliers, its pledge of cooperation. Such pledge must be signed by a person, firm or corporation owning such business or by an authorized executive thereof.

The Contractor-Dealer Pledge —

The contractor-dealer pledge reads as follows:

"The undersigned hereby pledges itself (1) not to use, nor so far as lies within its power, permit to be used any electrical equipment, apparatus, appliances, or supplies which are now or may hereafter come into its possession or control, except for essential uses as that term has been or may be defined or applied from time to time by the Priorities Division of the War Industries Board; (2) that, in ordering electrical equipment or apparatus, it will furnish its source of supply, in the manner prescribed by such supplier, information regarding stocks of substantially similar ratings and types of all makes and the essential character of the sale or sales made or to be made justifying the order placed; (3) that it will use its utmost endeavor to reduce all stocks to the minimum consistent with the essential requirements of the trade served, to prevent hoarding of stocks, and to insure that they be distributed solely for essential purposes."

All orders placed in accordance with this pledge will be rated as Class C and entitled to priority and precedence accordingly; conditioned, however, that such dealer shall have on hand with its supplier its said pledge.

Any violation by any dealer of its said pledge must be promptly reported to the Electric and Power Equipment section and such section will certify such dealer to its suppliers to be no longer entitled to avail itself of the benefits of its priority classification under the circular and the Priorities Division will withhold from such offender all priority assistance.

To Be Taken Seriously —

In the past there seemed to be a desire on the part of some interests not to take seriously the pledge that they may have signed, or the suggestions made by interests who

were operating under a pledge with the War Industries Department. However, you will appreciate at this time that to continue to operate, it is going to be absolutely imperative that we not alone see that our business is conducted along the lines as suggested, but that competitors or others similarly engaged, do likewise. Any deviation from the rules should be immediately reported to your supplier.

What Is Essential —

The list of essential industries will be found in the Electrical World of September 14th, or can be obtained by communicating direct with the War Industries Board, Washington, D. C. General information regarding the interpretation of classifications can be had by going carefully over Bulletin No. 4 with supplement thereto and Bulletin No. 5 with supplement thereto. You should be able to obtain copies of these bulletins from your local Chamber of Commerce.

It must be remembered that there is no desire on the part of the War Industries or Priorities Boards to take any action that may, in the final analysis, affect the essential industries of the country or affect the establishing of new industries that are essential to the winning of the war. Nor is it the policy of the Boards to prohibit the building of homes when such are necessary for the housing of laborers, who may be employed in essential industries, nor cause undue hardship to the present owners of buildings.

The State Council of Defense in Charge —

With this idea in view the War Industries Board has instructed the State Council of Defense to form an organization for the supervision of all new construction. You will find that the State Council of Defense has appointed representatives in each county of the State who will be in a position to give you such information as you may require from time to time covering installations, etc. At the present time the State Council of Defense recognizes the necessity of completing existing buildings or installations, particularly where work and construction have been under way for some time. Also it recognizes the necessity for the maintenance and repairs to existing installations and buildings. Therefore, this Council is permitting owners or tenants to make repairs or additions to present installations when same are necessary and where the total amount of material and labor involved does not exceed the sum of $2500. If the amount exceeds $2500, then a special permit must be obtained from the State Council of Defense.

At no time will the Board permit the erection of buildings regardless of whether the sum is less or in excess of $2500, without first having been presented with all the facts and a permit issued therefor. However, buildings on farms will be permitted without special authorization from the Board, when the amount involved does not exceed $1,000 for all labor and material.

Still Further Restrictions —

It must be borne in mind that although construction or repair work may be approved by the War Industries Board or by the State Council of Defense, it will not necessarily follow that you will be able always to obtain material for such work. This condition will prevail due to the shortage of stocks or orders in the hands of the suppliers that may have precedence over the material required for this specific installation. I recommend that electrical contractors bidding on work coming under the $2500 class or work in excess thereof that may have been approved by the War Industries Board, add a clause to their bids, stating that their quotation is given subject to their ability to obtain material in accordance with the rules set forth by the War Industries Board. Also, if there is any question in the mind of a contractor-dealer as to whether he can or cannot supply a given industry, that he take the matter up with his supplier with whom he is in the habit of doing business and in this way endeavor to eliminate any possible chance of misinterpretation of the pledge which he has given.

Where the Contractor Failed —

I am reminded of an incident occurring in the northern part of the State where an electrical contractor, performing the work on an essential job, placed his order with his supplier, and in turn shipment was made. One of the other members of the firm, not having been informed that his partner had already placed the order for the material, placed a similar order, and the supplier accepted the order and made the shipment. The salesman in the territory later became informed of the facts yet did not make any attempt to have the duplicate order returned to the supplier. Therefore, in this case, the salesman as well as the contracting company are equally responsible and both parties could justly be accused of being disloyal.

A similar case was brought to my attention in Southern California where a contractor through misrepresentation on his part endeavored to obtain materials to complete a job, when later the supplier found that the job had already been completed from materials which the contractor had in his own stock.

No true American can, at this time, afford to have the public look upon him as disloyal, yet acts of this kind are apt to be so considered. Consequently in true keeping with the spirit of your pledge, it becomes necessary for those engaged in the industry to see that cases of this kind are promptly reported to the proper authorities.

THE VALUE OF THE ASSOCIATION IN WAR TIME

BY R. M. ALVORD

Readjustment Needed —

Mr. R. M. Alvord, in calling attention to the present importance of association work, believed that in facing war-time problems, the electrical industry has a task similar to that which has been faced, or is being faced, by practically every industry in our country, and which has not been faced by the industries in France and in England. There is practically no industry whose usual business has not been seriously upset by these war conditions. That a satisfactory, and in many cases entirely profitable business is being conducted in most industries today is due to the fact that they followed not the slogan "business as usual," but rather the slogan "business just the same." They have adjusted their activities to meet war-time needs, and we in the electrical industry must do likewise.

A Local Committee —

In the adjustment of our electrical industry to meet war conditions our first thought must be to find that activity for our trained experienced forces which will best enable us to help win the war. Activities that are suggested to the contractor-dealer to replace non-essential work that he can no longer do, must be measured by this standard. Better still, the contractor-dealer association can make a survey of their resources and take their problem, with a summary of that survey, to the Resources and Conversion Section of the War Industries Board where they can, as an association of individual firms, receive suggestions as to the best way in which they can help in the big work. I suggest that a Conversion Committee be formed in each district or section of the California Association of Electrical Contractors and Dealers to cooperate with the Campaign Committee in working out the problem, each in its respective section.

English Experience —

That your business cannot be conducted as usual does not imply that it need be ruined, provided immediate and proper steps are taken to readjust your business to methods and products suitable to the country's new conditions. In fact, English experience indicates that businesses that are promptly adjusted have usually met with a marked increase in business and prosperity, and that this applies to business outside of, as well as inside of the communities where industry is largely devoted to war work.

In Other Industries —

It is expected that our industry will find activities enabling contractor-dealers to hold the association together and also to do their full share of war work. In other papers definite suggestions have been made for the electrical contractor-dealers' work in California. A few instances of what has happened in other places and in other industries may suggest ideas that will be helpful here. A glass works that was making bottles for non-essentials is now making glass caskets for burial purposes. One beer brewer is now operating as a bread baker. A malt concern in San Francisco is now making syrups and other ingredients for the use of bakers and confectioners. Jewelry manufacturers in this country are now manufacturing practically all of the surgical instruments that are used behind the lines in France. The regular surgical instrument manufacturers are confining their activities to their regular domestic and foreign trade.

In contrast to those radical adjustments is this case where apparently no effort was made to meet the war conditions. A short time ago a profitable job involving electrical, mechanical and ordinary labor was turned down by several electrical contractors in one of the cities of this state apparently because it happened to involve ordinary labor which was a little bit out of their line. If the contractors generally throughout the State are to take this attitude they will face a very difficult, if not ruinous, situation. They cannot possibly maintain "business as usual."

Legitimate War Business —

On the other hand there is unquestionably plenty of business to which the contractor-dealers can turn; business that is profitable, too. Wherever there is a young man in the business who desires to close out and take his place at the front, it should be through the association that arrangements are made for the other members in that community and vicinity to relieve the man of his stocks. The association will thus serve the country—first, by relieving the man for army or navy work; second—by conserving material which he had on hand and selling it in places where it will do the most good, possibly for strictly essential work, rather than having it dumped on the market at a sacrifice sale and have it purchased by people who really do not need it. This, as well as other activities, can best be handled through the association.

A War Service Committee —

The war service committee plan by which every industry is organizing its war service committee to deal for the industry with the Government, is proving the necessity as well as the great value of associations and other cooperative activities. The Government has found it impossible to deal with individual concerns, and they are asking, and have asked, the Chamber of Commerce of the United States to organize industries where they were not organized. They have asked that industries when organized deal with the Government through war service committees. These war service committees secure war orders, develop maximum production, arrange accurate cost sheets for the Government and conserve business establishments by the wise allocation of war contracts.

These committees also aid in the conservation of labor and materials, arrange for substitutions and shortcuts in manufacture. They are also working to maintain contact with our foreign markets. They assist in the labor situation and plan for training women in work where they can serve in place of men. They study how plants in whole, or in part, may be converted to more essential activities. They are strengthening individual industries into closer organizations for the future. The Conversion Committee which I have suggested should help you locally in similar ways.

The Man Who Stays Out —

Before the war we were gradually developing into an age of craft association. The war intensified the need for the most effective cooperative work, and we now have an age of craft association. The business man who does not accept a part in this great development and join his particular craft association and be active in it, will find himself left by the wayside in the new cooperative competition that we are rapidly learning to practice. He will be left by the wayside because, **first**—an intimate knowledge of any business is so broad and interconnected with other businesses that no man is able to fully comprehend it. **Second**—in an association there are many men and many minds working toward the same ultimate end, resulting in the individual's strength and ability being multiplied many times, thus resulting in greater effectiveness and achievement. **Third**—the war is causing the Government and people generally to be more exacting in their requirements. Each individual and each association will be held strictly to account for the service which he gives in return for the customer's dollar. After we win the war you will find that society will not permit to live the organization or company that does not conduct its business efficiently and on an economic basis. No man or organization who fails to profit by the collective educational and improvement work of his craft association can hope to survive.

The High Ideal —

Education and improvement to the highest point of efficiency and service will be obtained in any industry or craft only when a high ideal is set and subscribed to by all of its association members. For this purpose we need in the electrical industry a general code of ethics which will be a statement of the principles of good business conduct that are recognized by the best business men in all lines. There have been two or three different codes outlined for different sections of the electrical industry. Those that I have seen here are supplemental and deal with certain detail conditions within our industry. We need first a code of ethics for business men that will apply to each and every one of us in the electrical industry as it applies to men in other businesses. Around this fundamental code must be erected the detail standards of practice that should apply to the individual divisions of our industry. These standards of practice will all be founded on one or more of the general fundamental principles outlined in the following code:

First: To consider my vocation worthy, and as affording me distinct opportunity to serve society.

Second: To improve myself, increase my efficiency and enlarge my service, and by so doing attest my faith in the fundamental principle that he profits most who serves best.

Third: To realize that I am a business man and ambitious to succeed; but that I am first an ethical man and wish no success that is not founded on the highest justice and morality.

Fourth: To hold that the exchange of my goods, my service and my ideas for profit is legitimate and ethical, provided that all parties in the exchange are benefited thereby.

Fifth: To use my best endeavors to elevate the standards of the vocation in which I am engaged, and so conduct my affairs that others in my vocation may find it wise, profitable and conducive to happiness to emulate my example.

Sixth: To conduct my business in such a manner that I may give a perfect service equal to or even better than my competitor, and when in doubt to give added service beyond the strict measure of debt or obligation.

Seventh: To understand that one of the greatest assets of a professional or of a business man is his friends, and that any advantage gained by reason of friendship is eminently ethical and proper.

Eighth: To hold that true friends demand nothing of one another, and that any abuse of the confidence of friendship for profit is foreign to the spirit of good business, and in violation of its code of ethics.

Ninth: To consider no personal success legitimate or ethical which is secured by taking unfair advantage of certain opportunities in the social order that are absolutely denied others, nor will I take advantage of opportunities to achieve material success that others will not take because of the questionable morality involved.

Tenth: Finally, believing in the universality of the Golden Rule—ALL THINGS WHATSOEVER YE WOULD THAT MEN SHOULD DO UNTO YOU, DO YE EVEN SO TO THEM—we contend that society best holds together when equal opportunity is accorded all men in the natural resources of this planet.

This code of ethics has been adapted from a code that is recognized by leading business men in many lines in this country. I recommend that every man and woman in the electrical industry in California adopt it as his or her code of ethics, and that we build our educational work and our cooperative competition upon its fundamental principles. I hold the firm belief that the superstructure of our industry will then be well builded on a lasting foundation, insuring every branch of our industry a leading place in the business of the world for all time to come.

CENTRAL STATION CO-OPERATION IN ADVERTISING

BY G. B. McLEAN

The Proposed Campaign —

G. B. McLean, Assistant Superintendent of Sales of the Southern California Edison Company, in speaking of The Proposed Advertising Campaign said:

By means of a comprehensive advertising campaign the advisory committee of the California Electrical Cooperative Campaign is endeavoring to "tie in" the highly important work it is now prosecuting, with the individual central stations, contractor-dealers and other merchandisers throughout the state. This appeal is being made to the consuming and purchasing public through newspaper display space and window card displays. A uniform style of newspaper copy and display card has been adopted. Sets of each have been freely distributed to all central stations and merchandisers of electrical appliances. The subject matter informs the public and the present users of electrical appliances of the different methods of cooperation engaged in by the electrical industry of the United States and the Government for the more effective use of electricity to help win the war, and makes an appeal to them to enter into this movement, in their every-day life, giving suggestions and recommendations how the much desired cooperation upon their part of the consumer and purchaser can be accomplished.

A Christmas Broadside —

When the cooperative campaign was undertaken the central stations offered the use of a part of the advertising space they use in the different newspapers in their respective territories during the months of October, November and December for the exploitation of the work. From the very inception of the campaign the committee recognized the necessity for advertising in order to spread the story of the movement. It saw, by focusing attention upon the contractor-dealer and merchandiser, a cooperation could be impelled that would bring cash into the pockets of this branch of the industry at a time when it is sorely needed. It also saw the duty owed the public in acquainting them with the government-approved conservation measures as affecting the use of electricity. We knew the public would enter into the movement with the proper spirit once the facts were made known to them. The committee went into this subject thoroughly. It saw at a glance that an advertising campaign, such as is needed to put this movement across, must necessarily cost a good deal of money, greatly more in fact than appropriated for this phase of our work. By availing ourselves of the newspaper space offered by the central stations we can get our story to the public and in turn bring about a closer relation between the consumer and the central station, and the consumer and the contractor-dealer.

The Results —

After giving much thought to the subject matter and character of the proposed advertising, a series of fourteen newspaper displays has been adopted. These have been printed and made into sets for the use of the advertisers. They may be made use of either as "printer's copy" or as suggestions of proper subject matter for the central station and merchandise copy writers to follow in preparing advertising copy. This copy was prepared for use and if the advertisers follow it closely—and many of them have signified their intention of doing so—the committee feels that this will do a great deal toward directing public attention to the electrical conservation movement.

This copy has been prepared in accordance with an adopted form. It may properly be entitled a series on "How Electricity Is Winning the War." This catch line appears at the head of every advertisement. Then come the display lines and the body of the advertisement. A big paragraph

How Electricity Is Winning the War

Electricity is a War Necessity

¶ The manufacturers of electrical appliances have received the following suggestions from the Government for the most effective use and distribution of electrical appliances during the war:

NEW APPLIANCES:

¶ No new appliances should be installed in a home where it is necessary for the power company to install new transformers or to add to their present equipment, because such material is now dedicated to war purpose.

OLD APPLIANCES:

¶ Appliances already installed should not be withdrawn from use because their careful use effects a distinct saving; they should not be replaced with new appliances so long as the old can be repaired and kept in service.

¶ Consult your electrical contractor dealer as to what electrical appliances bear the stamp of Government approval. Ask him to help you help win the war by the most effective use of your electrical service.

A WAR-TIME CHRISTMAS!

The Government urges that Christmas giving be confined to useful articles.—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

The first of a series of advertisements which are to appear in papers throughout California, one a week, from Oct. 21st up to Christmas time. Central stations are donating a part of their advertising space for this purpose, so that with the regular dealer's advertising, the broadside may be an effective one. This discussion of the value of electrical appliances is advertisement No. 1, scheduled to appear Oct. 21st.

headed "A War Time Christmas" set in black face type calling attention to the governmental restrictions on holiday buying and the admonition to shop early, is placed at the bottom of each above the signature of the advertiser. Every advertisement contains the advice to the reader that he or she consult an electrical contractor-dealer for information concerning the electrical war conservation measures and what appliances bear the stamp of governmental approval, and all matters electrical. If the spirit of the copy is entered into by the advertisers and contractor-dealers the committee believes it cannot but help to bring about a much desired and very helpful cooperation.

Assistance of the Committee —

The committee is anxious and willing at any time to render any assistance possible either to central station or contractor-dealer in connection with their advertising policy. We believe that if the central stations and dealers will pay close attention to this very important feature of their business, using their advertising space to the best advantage, "tie-in" their advertising with such national advertising as may appear in the publications of national circulation from time to time, and cooperating with this committee in every way possible, it will not be long before they will find that the impression created upon the public mind will begin to be reflected in the increase in the number of people who each day visit their places of business.

MEETING WAR CONDITIONS

BY M. L. SCOBEY

Dealer and Contractor —

"How can the electrical dealer meet war conditions?" In answer to this query Mr. M. L. Scobey, of the Home Electrical, San Francisco, set forth many ways for the contractor-dealer to help himself. The majority of contractor-dealers, he said, are seeing their contracting business dwindle down to the vanishing point and they cannot look for any material improvement for several months to come, as building orders

How Electricity Is Winning the War

Every User of Electricity Can Help to Win the War

¶ Every branch of the Electrical Industry in the United States is co-operating with the Government to bring our electrical power to the support of the country in its time of need. The brains of the country are being directed to the saving of some essential—fuel, food, time, money, labor, transportation.

¶ Every pound of coal, every barrel of oil, every ounce of metal is imperative for war needs. Whenever the utilization of electricity or the use of an electric appliance will effect such a saving a distinct war service has been rendered. Never in the history of man has there been an opportunity for the realization of more necessary service and general good than is presented to the user of electricity today. All dealers in electrical appliances and power companies have been advised what constitutes electrical war necessities. Have a talk with your electrical contractor dealer and learn how you can make the electricity at your switch more valuable to the Government.

A WAR-TIME CHRISTMAS!
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

The electrical conservation movement—Advertisement No. 2—to appear Oct. 28th

How Electricity Is Winning the War

Buy Useful Christmas Gifts This Year, and Buy Now!

¶ The following restrictions under which retailers will sell holiday goods throughout the country have been agreed upon between the Chamber of Commerce of the United States and the Council of National Defense at Washington; co-operation of the buying public is requested:

¶ Retail interests are not to increase their working forces by reason of the holiday business over the average forces employed during the year.

¶ Normal working hours will not be lengthened during the Christmas season.

¶ *Retailers will use their utmost efforts to confine Christmas giving, except for young children, to useful articles.*

¶ Every effort will be made to spread the period for holiday purchasing over the months of October, November and December.

¶ Deliveries will be restricted and customers will be asked to carry their own packages wherever possible.

¶ Announcements of the new policy will be made by retailers in their newspaper advertisements.

A WAR-TIME CHRISTMAS!
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

The government's holiday restrictions—Advertisement No. 3—to appear Nov. 4th

How Electricity Is Winning the War

Electrical Appliances For Christmas Gifts

¶ The Government urges that Christmas giving this year be confined to useful gifts.

¶ What is more useful than electrical appliances? They serve a two-fold purpose—saving for your government and saving for your household.

¶ Electrical appliances are attractively manufactured and are a distinct addition to the interior ornamentation of any home. Ask your electrical contractor dealer for complete information regarding Government approved electrical appliances.

A WAR-TIME CHRISTMAS
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

Appliances as war gifts—Advertisement No. 4—to appear Nov. 11th

How Electricity Is Winning the War

Your Electric Lamps Can Help Win the War

¶ A little thing like an electric lamp is a big factor in the winning of the war.

¶ Are you using the correct lamp? That's the point.

¶ If you are using carbon lamps you are not doing your full duty to the Government. Carbon lamps are wasteful and consume more electricity than is necessary.

MAZDA Lamps Are War-Time Lamps

¶ If your home, office or factory is not thoroughly equipped with MAZDA lamps see that it is done so at once. Call in your electrical contractor or dealer and make the change immediately. MAZDA lamps effect a war time saving. Ask your electrical contractor dealer about other electrical war time savings.

A WAR-TIME CHRISTMAS
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

Urging the use of Mazda lamps—Advertisement No. 5—to appear Nov. 18th

How Electricity Is Winning the War

Mothers, Wives, and Daughters! Save More Time and Money For War Work

¶ The Government asks you to save electricity—likewise, fuel, time, food and money. Try the following suggestions in your home. They are approved war conservation measures and lessen the worries and expense of housekeeping.

Don't use wasteful carbon lamps—use the economical "MAZDA" lamps.

Don't light the kitchen range to broil, fry or toast—do it at the table with the *Electric Grill* and *Toaster.*

Don't worry about washing and ironing—save a day a week with the electric *washing machine and electric iron.*

¶ If you have electricity in your home make it keep house for you. It gives more economy, efficiency and convenience—more time for war work.

¶ Ask your electrical contractor dealer today how he can help you help win the war by the more effective use of your electric service.

A WAR-TIME CHRISTMAS!
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

Time saving through electrical appliances—Advertisement No. 6—to appear Nov. 25th

How Electricity Is Winning the War

An Electric Washing Machine Is a War-Time Necessity

¶ The Government has placed its approval upon the purchase and the use of electric washing machines. They consume a minimum amount of power at a low cost and save clothes, time, labor and fuel.

¶ Housewives, by using electric washing machines and electric irons, can do two days' work in one—and thereby save another full day for war work.

¶ Ask your electrical contractor dealer for full particulars regarding the electric washing machine and other war time saving electrical appliances.

A WAR-TIME CHRISTMAS!
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

The value of the washing machine—Advertisement No. 7—to appear Dec. 2nd

How Electricity Is Winning the War

Begin the Day by Saving To Win the War

¶ Cook your breakfast by electric appliances on your breakfast table. Why waste coal, fuel, oil or gas (which the Government needs) when with more convenience and invaluable time saving you can cook your morning meal with electricity.

¶ Ask your electrical contractor dealer for complete information on war time saving electrical appliances.

A WAR-TIME CHRISTMAS!
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

The use of breakfast appliances—Advertisement No. 8—to appear Dec. 9th

How Electricity Is Winning the War

War-Time Economy Lighting In Factory and Shops

¶ Many factory owners have given little attention to their lighting requirements. Modern lamps and reflectors will completely revolutionize the lighting in many industrial plants.

¶ The improvements in interior lighting methods have been so rapid, industrial plants that were modernly equipped four or five years ago, are today radically out of date. It will be economy to tear out the old and install the new. In many cases re-wiring will not be necessary. New type MAZDA lamps and reflectors will give the most efficient results at much smaller cost.

¶ Have your electrical contractor dealer inspect the lighting in your plant and advise you what is best to secure most efficient results.

A WAR-TIME CHRISTMAS!
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

The factory lighting situation—Advertisement No. 9—to appear Dec. 16th

How Electricity Is Winning the War

Repair Your Electric Iron Don't Throw It Away!

¶ War purposes make the saving of metals and fuels imperative—accordingly it is wasteful to discard any metallic appliance that can be repaired at small cost and efficient service obtained thereby.

¶ If your electric iron is out of order, take it to your electrical dealer to be repaired; it will be just as good as new. Don't throw it away or buy a new one. You will deprive some housewife who wants to effect a war saving.

¶ Ask your electrical contractor dealer for complete information as to war time saving electrical appliances.

A WAR-TIME CHRISTMAS
The Government urges that Christmas giving be confined to useful articles—Give electrical appliances. The Government has ruled that no extra salespeople can be employed during the Holiday Season—*SHOP EARLY.*

(SIGNATURE)

A repair work campaign—Advertisement No. 10—to appear Dec. 23rd

and restrictions are becoming more stringent from week to week. Those that hope to succeed and remain in business are understanding that they must look for other channels than the contracting business for their source of revenue and profit.

A Real Opportunity —

While at first glance the outlook may seem desperate to some, it is, in my opinion, the big opportunity that is going to be the making of electrical dealers and put them in their rightful position in the business world.

In the past, practically all thought and effort has been given the contracting end of the business in its various branches, while little, if any, has been devoted to the merchandising or retail business. Such of this business as has come our way cannot be attributed to any real sales effort and has been, in reality, a by-product of the contracting business. From now on, those who stay in the business must necessarily reverse their methods to a large extent and let their efforts be centered on the merchandising business and let such contracting work as they may be fortunate enough to obtain be a by-product of their sales of current consuming devices.

Know Your Ware —

First of all, and although some of you may laugh, I'll warrant it will apply to more than one—first of all you must be thoroughly familiar with the uses and merits of the devices on which your efforts will be concentrated: you must have every confidence in the merchandise you offer for sale, and before you can hope to sell it to the user you must have sold it to yourself.

Surely the larger percentage of electrical socket devices now on the market are worth having and it is your duty, or I might say, your opportunity to show the housewife that they are worth while, that she will be made happier by their use, that her labors can and will be made less arduous by the possession and use of an iron, toaster, percolator, grill, vacuum cleaner or washing machine.

An Essential Industry —

The dealer must have no hesitancy in suggesting or urging the use of any of these devices because they are worth while, and it may be well here to substantiate this statement by saying that the Priorities Board has ruled that these various appliances for the home are useful and necessary and will continue to be manufactured because they can be made to conserve both fuel, time, labor and material.

Do not have the feeling that the consumer is being asked a favor by purchasing a percolator, or other device, because while she is perhaps doing you a favor, you are at the same time conferring perhaps a greater favor upon the prospect by bringing to his or her attention an article that is the best of its kind, sold at a fair price, and will surely lessen their labors and release more of their time and energy for other pursuits.

The Appearance of the Store —

I am very glad to be able to report that the general appearance of the electrical retail stores in California has, on the whole, greatly improved during the last few months, but as it is an item of vital importance, I am going on the assumption that there is still room for improvement and will go over a few points that must be given attention.

Always bear in mind that 90% of the buying is done by women and unless your store is made to attract and hold their patronage and confidence, no dealer can hope to succeed. Women are accustomed and used to neatness, order and cleanliness and what they have themselves they look for in others, so your first thought and effort must be to see that the store is kept scrupulously clean, the shelf stock in order and the nickeled devices should be dusted and polished early and often. Make the store attractive to her and you will then have made an entering wedge into her regard and confidence. When I say attractive, I do not mean that the store should be made to look like a high-class jewelry store, because in that event the customer is apt to get the impression that the first cost, and operating cost as well, would naturally be out of their reach if they are sold in such stores.

The Show Window —

The show window will be found to be one of your best assets and I want to give you a suggestion or two in that regard: See that your windows are as well, if not better lighted than any business house in your particular city or district. You are in the business of selling light and if the other merchants like the lighting of your windows they are apt to give you a job of making theirs as good as yours.

Don't try to put too much in the window at any one time but rather change the display oftener and use just a few of one or two devices, and in this way the passer-by or prospective customer will get the definite impression that you are selling toasters and percolators, whereas if you had a lot of miscellaneous articles on display, chances are that no definite impression will be left with them by a casual glance in your window.

Pricing Articles —

It is also good business to have articles priced in plain figures, not only in the window but in the store as well, for it helps gain the customer's confidence and gives her an opportunity to decide at once whether the article in question is within her means or not, but if the article is not priced, there is a question in her mind as to what it might cost. Many women will not take the chance of going in to ask the price and then have to make some excuse to get out gracefully if the price is more than they thought it would be or were able to pay.

Another thing in this connection that should not be overlooked is, to have a card or series of cards which explain the merits of the device and the various uses to which it may be put. I have found that in a number of instances, the descriptive card has been the means of their deciding there and then that that was the article they were looking for.

Personal Appearance —

Contractor-dealers have made the mistake in the past of not paying enough attention to their personal appearance or to the appearance of their organization, and it is of almost as much importance as having the store kept clean. I feel safe in saying that it is almost impossible to go into any dry goods or department store and find the proprietors or clerks with their hat on or coat off, or keeping a cigar in their mouth while waiting on customers, but I have seen just those very things happen in many an electrical shop. And then some of us are wondering why the women will insist on going elsewhere to buy their electrical devices and supplies. It is the small things that count with a woman and she even appreciates the fact that her parcel is well and neatly wrapped and she feels sure of reaching home without its becoming undone.

Outside Selling —

In my own case, I found that there was not enough business to warrant spending my time in the store, so I engaged the services of a woman, to whom I am teaching the essentials of selling. This enables me to spend practically all of my time on the outside, going after new business, and I find that in most cases the business did not have to be created but was there waiting for somebody to come along and get it.

Before starting out, sit down and determine what you are going to sell that day or for the next three days or a week, and having made your decision, concentrate your efforts on that particular device or article. I feel confident that the results of your efforts will more than exceed your expectations. If it should happen to be your first effort along these lines, perhaps it might be well to begin on the easiest article

we have to sell, one that is needed in every home and business—namely, the Mazda lamp.

Next, make a list of ten or twelve names of people with whom you are acquainted or have previously done business, and any that you may find that are not in immediate need of lamps; jot down the time or approximate date that they will be in need and don't neglect to follow it up.

If next week you decide to go out for vacuum cleaner or washing machine business, endeavor to make arrangements in advance with either your bank or central station about taking care of such sales on the deferred payment plan, so that after telling Mrs. Roberts all about convenience, saving of time, labor and materials, you will be able to clinch your sale by being able to tell her that she need only pay so much on delivery of machine and so much each month.

The Uses of the Installment Plan —

In this regard I wish to say that there is no denying or getting around the fact that the deferred payment, or installment plan of buying, is the most potent factor in the merchandising business today and is one thing that the electrical dealer has not taken advantage of. Think of the leverage that the electrical dealer can bring to bear when he goes into the home and offers a much-needed, useful device that the woman will be glad and proud to have and use, if he is able to tell her that an electric washing machine will cost only $10.00 down and $5.00 a month, instead of putting all ideas of buying out of her head by saying that it is going to cost her $100 or $150, as the case may be.

And the dealer need have no hesitancy in either handling such deferred payments himself or of putting the proposition up to his bank, because it is safe and sane business practice, and has been tried out by some of our foremost merchants and found to be a success. The title to any article remains with the seller until payment has been made in full by the purchaser and I have it on very good authority that the percentage of losses on sales made on this plan are very small.

Outside of Mazda lamps, this plan can be well applied to any and all devices on which the dealer may decide to make his campaign. And when once under way, you will find that the sale of one article brings on the sale of another, because you have rendered a service that is of value to the purchaser and when she is again in the market for anything electrical, you may rest assured that she will apply to you for whatever she may need.

However, the dealer should keep a record of all sales made, together with names of people who have not yet purchased, and at frequent intervals they should be either visited or called on the phone and inquiry made as to results obtained from the device sold. In many instances the woman will not only say that it is working better than she ever thought for, but she is apt to add that Mrs. Brown saw it and was very much interested, and that is your opening for another sale.

LEGITIMATE BUSINESS IN WAR TIME

BY G. E. ARBOGAST

To Get Into Action—

Mr. G. E. Arbogast likened the present condition of the electrical contractor to an incident that took place in the army. "Now, Lieutenant," said the General, "you have the battalion in quarter column facing south, how would you get it into line, in the quickest possible way, facing north?"

"Well, sir," said the Lieutenant, after a few moments' fruitless consideration, "do you know, that's what I've often wondered."

We are facing a similar dilemma; by the coordinated effort of the California State Association of Electrical Contractors and Dealers and the California Electrical Cooperative Campaign, stimulated by the good will, alike, of the central station, jobber and manufacturer, the forces of the electrical contracting industry in California have been marshaled and an imposing line drawn up; yet in the face of existing conditions and at a time when clarity of vision and steadfastness of purpose is most vital, we seem unable to "right about face" and get into action.

The electrical contractor has not yet found himself, too many of us have been laboring under the delusion that "business should be conducted as usual." The fallacy of this argument has been sharply met by recent restrictions of the War Industries Board, affecting, directly or indirectly, every industry in the country.

Finding Out What Is Essential —

A readjustment of the electrical industry is inevitable. As a belligerent this country has already outgrown the "business as usual" stage of thought as well as practice. There is not enough capital, labor, coal, transportation or raw material to go around if those industries which are not essential to the conduct of the war are continued at their normal productiveness.

As an aid to all production electricity is the greatest single power and of invaluable service. On the farms, in the mines, in our factories, and wherever production is being forced, man's greatest servant is playing an enormous part. In lighting, electricity is serving as effectively as in turning the wheels of industry. Efficient lighting means not only more rapid production but a better quality of production. It offers the only means of obtaining continued effort, making possible 24-hour production.

Electrical Contractor Not Going Out of Business —

I have no patience with the pessimistic view held by many in the industry, that due to building restrictions by the War Industries Board, "the electrical contractor will have to go out of business." The great trouble with most of us has been lack of appreciation of our full opportunities during peace times. Go over in your mind for a moment, your business for the past four or five years: Haven't you been satisfied with just poring over the latest new building notices and then hastily attempting to figure every cottage, flat, apartment, garage and store building you could possibly reach before the contract was let? How many of you have stopped to consider the future of your business? True, you have obtained a few contracts, but only as many as your competitors would let you have. It would have been better not only for yourself but the industry as well, had you erected your business upon a solid foundation of "service" and "goodwill," along more permanent lines of endeavor. To become a factor in the business life of a community you must become a part of its business and industrial life. Had we realized this fact but yesterday, the industrial opportunities of today would have become an open door.

If we are to do our part as members of the electrical industry in helping to win this war we must take full cognizance of the opportunities that exist in every section to supply, not only the electrical equipment for new war industries and manufacturing plants, but to assist in improving and maintaining the necessary means to production already installed.

A Chance for the Contractor —

As a means of accomplishing power and light conservation in manufacturing and industrial establishments, the United States Fuel Administration has requested that attention be given to every detail that would contribute to economy and suggests the following items as a typical illustration of possible waste and opportunity for conservation:—

1—Lights being unnecessarily burned.
2—Lamps of too high candle power.
3—The elimination of carbon lamps in favor of Mazda lamps where practicable.
4—The elimination of arc lamps and substitution of nitrogen filled lamps which are from two to three times as efficient.
5—Operation of motors when machinery is idle.
6—Excessive sparking, heating, or erratic speed of motors.
7—Grouping of machines so as to operate motors as nearly loaded as possible.
8—The testing out of power circuits for relationship of capacity to load carried.
9—The paralleling of power circuits.

Here is an excellent opportunity for your best endeavor; but don't make the mistake of thinking that, because you are in business, the need will seek the man. Plan to go out after it.

Going Out After It —

I would strongly urge upon every electrical contractor in a position to do so, to start immediately a systematic campaign of calling upon or circularizing the industrial and manufacturing plants in the community served, and inform them of the character of your business and the service you are prepared to render.

At the same time, it will be well for you to compile data bearing upon the activities of the industries and familiarize yourself with the lighting and power problems peculiar to each branch. The installation of safety-first switches and protective devices should receive your particular attention.

In order not to cover unnecessary and fruitless grounds you should endeavor to work closely in touch with the central station, to determine just what industries they would be permitted to serve, and to this extent, I believe, the central station will gladly cooperate, for in so doing they will to a great degree be relieved from all demands of prospective consumers for assistance in putting their installations into working order.

In the Rural District —

For the contractor who resides in the rural districts, the field for new business is almost unlimited. The farmer is fast becoming awakened to the fact that he must bring to his aid labor-saving machinery and devices in order to sustain increased production. It has been estimated that over one hundred thousand farm lighting outfits will be sold this year. When you consider that over fifty per cent of our population live on the farms you begin to realize that the greatest single market for the sale of electric motors, electric appliances, fixtures, lamps and the necessary wiring installation is waiting your development. Are you going to be the first to develop this profitable source of business, or will you let it slip through your fingers and pass into other hands?

The draft will relieve many of our younger electrical contractor friends of the problem as to how to help their country, but for the remainder of us it is high time that we realized that we have a special service to perform—one that will help to keep the wheels of industry turning.

MRS. O'HOOLIHAN ON OVERHEAD

"THE RAISON COLUMBUS DISHCUVVERED AMERIKY," said Mrs. O'Hoolihan, removing the safety pin from between her teeth and converting it into the perilous connection between waist and skirt to which she pinned her usual faith, "wuz becuz av the overhead ixpinse. Whut Oi mane t' say," she continued, "is that up t' that toime the departmint shtore buyers had been thravellin' across counthry t' Injy r-regardliss av cost and the haythen robbers on the dhisserts and whut with the salesmin

When the overhead grew so heavy that it became impossible to make money on goods from India, it was time to discover America, according to Mrs. O'Hoolihan, who argues that it is not the amount you spend for overhead that matters—it is what you spend it for, and that the way to reduce your overhead is to spend it more wisely and increase your sales.

askin' more wages ivery day and the wimmen folks beginnin' t' luk fer ind-o-the-month sales and bargain tables, 'twus a har-rd toime the merchints wuz havin' makin' both inds mate. Siveral av the big fir-rms wint into bankthrupsy, Mrs. Casey, sillin' purls and feather boas from Injy at roonous prices consitherin' the cost av the thrip and things wuz lukin' purty disprite whin this felly Columbus has an idea. 'Ef ut doesn't pay t' sell things the way ye've bin doin' bizness and ye can't git more fer the goods,' sez he, 'the only answer is t' cut down th' ixpinses,' sez he. And he up and dishcuvvered Ameriky. Av coorse, Mrs. Casey, he didn't do whut he sit out t' do, which same wuz t' shtart a cut r-rate shtame boat service t' Injy and r-redhuce th' overhead, but he opened up a new markut and the principul wuz th' same.

THE GREATEST INFLOONCE FER PROGRESS in the wur-rld today, Mrs. Casey, is the overhead ixpinse. 'Tis a har-rd thing to lurn a grane survint gur-rl t' use an ilicthric ir-run, the cord bein' in the way whin she wants t' carry ut t' the shtove—and 'tis few shtores wud be practicin' modurn mithods av adhvertisin' or diliverin' with attymobiles today if 'twere not fer havin' t' do bizness enough t' pay fer their overhead. Fer though th' cost av livin' hez been goin' up, Mrs. Casey, ye'll note there is more shtrate car condhuctors ownin' Ford-car-rs today, Mrs. Casey, thin there wuz durin' the Revolooshun. And ef ye had bin yer own gr-reat grandmother, ye wud hev thought be the number av things ye didn't have that 'twas Ger-many in war toime ye were livin' in, whin mebbe 'twas only Philadelphy. Th' same being' a token av the fact that the cost av things is more dipindhent on whut's in a man's p-hay invelope than th' price on th' tag. And ye'll notice, Mrs. Casey, that th' shtorekaper has to pay the wages at the same toime he's gettin' liss fer his goods. Wance more—'tis thrubble with the overhead ixpinse. 'And whut duz he do about ut?' sez I. 'He cuts down his overhead,' sez you. 'And does he do ut be dischar-rgin' th' clerk and movin' to a chaper neighburhood?' sez I. He duz not.

"HE DISCHAR-RGES THE CLERK, mebbe, but he hires another wan that's bin managin' the har-rdware shtore down th' block and pays him twoice the sallry and he moves down town and puts on a new shtore front with glass cases and a movin' sign. And havin' doubled th' number av his custhomers be this toime, his overhead is constintly goin' down. 'Tis not

th' money that ye pay out which is th' trubble with yer overhead, Mrs. Casey, it's whut ye pay it out for and a chape bicycle that wuz give ye be a frind may cost more fer tires and r-repairs in th' ind than a good wan at yer own ixpinse.

"BUT WHAT IS OVERHEAD, ye're askin' me, Mrs. Casey? Well, 'tis this way. Ef ye spind thray months wur-rkin' fer the chur-rch fair and thin ye go down and shtay all afthernoon sillin' the goods, aftherwards buyin' 'em yersilf, — why, whut the chur-rch gits is the proffit, Mrs. Casey, but 'tis yersilf gits the overhead. The overhead ixpinse is the

Overhead, says Mrs. O'Hoolihan, is the rent and the garbage that the young couples fail to add in when they are figuring how two can live as cheaply as one. It's not only the things which are consumed that must be counted in the cost but all the details of the housekeeping of your store.

rint and the garbage man the young cupples fergit t' charge into the account whin they're figurin' can two live on the proice av wan. 'Tis the differunce betwane the proffits as ye figure 'em on paper, Mrs. Casey, and the wans ye don't git rich on on account av havin' fergot the cost av the shtamps and the proice av the tablecuvver ye had to buy new by raison av spillin' the ink. 'Tis the raison there aren't more millionaires in the wur-rld today, Mrs. Casey. Ef ye bought ilicthric bulbs at thray cints and sold 'em fer thray and a tinth, ye'd get rich on ut, Mrs. Casey, if it wer-runt fer the overhead. But 'tis a shtrange thing and har-rd to belave that ye can buy a washin' machane fer five dollars and sell it fer sivin fifty, mebbe, and lose money on ut just the same. Manny's the man that has fergot t' charge fer his own sallry or the rint av the shtore, the same bein' his own—and thin has wondered why he didn't have enough money at the ind av the month t' pay his gr-rocery bill.

"AND 'TIS NOT ONLY THE RINT, Mrs. Casey. 'Tis the dollars ye moight have got ef ye'd putt the money where ye did not at the toime when ye didn't putt it there but putt it where ye did. And 'tis little Norah that swapes out the shtore before she goes t' school but will be puttin' up her br-raids nixt wake and tur-rnin' up her nose at the job, and ye having t' pay a boy fer the same. And 'tis the subscripshun t' the Ould Ladies' Home ye've got t' pay or they'll boycott yer place. And 'tis ivery iverlastin' thing that ye don't think av ixcipting only the cost av the goods, yer board and lodgin' and yer cuzin frum the counthry that lives on th' family bein' included under a sallry t' yerself. And on top av that, av course, Mrs. Casey, comes the proffit.

"AND THE OTHER FELLY'S OVERHEAD is just as important as your own, Mrs. Casey, which is the quare part av ut all. Ye may not think much av the face av Michael McGillicuddie down the block that kapes the har-rdware shtore and sills ilicthric goods on th' side and his place may be no fit home fer a pig to make his risidence, but 'tis just as important fer you that he makes a proffit as that ye make wan yersilf. Duz he sill vacuum claners at prices which no dacent man cud live on, barrin' a haythen, be raison av overlookin' th' overhead? Well, b'golly thin, 'tis yersilf is goin' without the proffit, too. Mrs. Smith won't pay five dollars for an ilicthric ir-run at your shtore ef she c'n git the identical object frum Mike at thray dollars and fiftane cints—and th' market fer foive dollar ir-runs will be rooned in her eyes fer iver afth[illegible], unless mebbe ye cud git up a war-r or somethin' and raise the proice av the raw matarials.

"THERE MAY NOT BE ROOM fer both av ye sellin' washin' machanes on th' same block, but if ye both reckon in yer overhead, 'tis the best man will win. Ef ye don't, 'tis the wur-rst—and he won't win naythur. Overhead, Mrs. Casey," said Mrs. O'Hoolihan, "is whut will win the war. 'Tis the cost the Kaiser don't reckon in, Mrs. Casey—whin he's talkin' t' the paple av their proffits, but he's got to pay it in the ind, Mrs. Casey, and it's whin the bills cum in 't the ind av the war, he'll have to go out av bizness. 'Tis a gr-rand thing, the overhead, if 'tis under foot, Mrs. Casey, but if 'tis raley over yer head ut is," said Mrs. O'Hoolihan, "thin Hivin help ye."

A WESTERN IDEA —

(The selling of washing machines is largely dependent on the possibilities of demonstration. The model laundry established by this Portland firm presents many advantages over home visits as here set forth. —The Editor.)

A MODERN ELECTRIC LAUNDRY has been installed by J. C. English & Company of Portland, Oregon, with the idea of least expense and also to demonstrate electric washing machines to the best advantage. The laundry is an integral part of their new store on Fifth street. This laundry has a tile floor with wash tubs, an instantaneous water heater, washing machine and mangle. Washing is demonstrated by a lady demonstrator.

The claims made for this method of demonstrating washing machines over the method of house-to-house canvass are as follows:

1. **Less expense.**
2. **Ideal conditions under which to demonstrate.**
3. **Does away with having any second-hand machines in stock and customers get a brand new machine.**
4. **Drawing card to get customers to buy other things electrical.**
5. **Gives an opportunity to educate customer for other electric labor saving devices.**
6. **Actual washings are turned out by using customer's clothing if so desired.**
7. **Easier to close contracts in store than at residences.**
8. **No time wasted on people who are not prospects.**

Technical Hints

BY GEORGE A. SCHNEIDER

(An interesting court decision which covers cases in which the municipality has gone into the wiring and electrical merchandising business, a consideration of advantages of the resistor type self-starter for polyphase motors and the report of recent experiences with the use of domestic appliances under heavy industrial strain.—The Editor.)

THE RIGHT OF MUNICIPALITIES TO ENTER INTO COMPETITION WITH THE CONTRACTOR-DEALER

Those electrical contractor-dealers who are located in a community having a municipally operated electric light and power system and who have had occasion from time to time to question the right of the municipality to legally engage in the business of merchandising electrical appliances or devices and doing wiring will no doubt be interested in a court decision recently reported in the New York Times.

In the case of Andrews vs. South Haven (Court records reference 187 Mich 294, 153 N. W. 827), it was held that a city which operated an electric plant and supplied its inhabitants with electricity had also in that connection the power to do electric wiring on private premises and furnish fixtures and other accessories essential and convenient in the use of electricity. The court said:

"Water sent through pipes to a customer's residence or place of business is water delivered to him ready for use in its then condition. He may heat or cool it, drink or bathe in it, and make whatever use of it he desires. But electric current delivered to him at his residence or place of business as it is transmitted over the wires, in its then condition, neither affords him heat, power nor light without further mediums and appliances. The statute and Constitution do not in terms limit the service to supplying the energy but authorize the city to supply its inhabitants with water, light, heat, power and transportation. It may well be contended that furnishing to customers taking electricity the necessary devices or equipment to produce heat, power or light from the current is naturally incidental to and an implied power connected with the business of operating an electric light plant."

"The old law of municipal trading, involving the propriety and expediency of authorizing a municipality to engage in general business in competition with its citizens conducting a private business of like kind, has little bearing here; but the rule remains that taxation can only be for public purposes, and municipalities have no express or implied power to engage generally in private business. We are past the general question of the validity of legislation authorizing municipal ownership and operation of plants and their necessary equipment to furnish the concentrated population of cities with certain general needs and conveniences, like water, light, heat, transportation, telephone service, etc., and it is held that the court will not interfere with any reasonable exercise of the implied powers to operate such plants in a business way, and as any private corporation could or would."

In connection with this decision it is especially interesting and instructive to note the distinction made by the court between merely supplying electric energy and that of supplying electric light, heat or power service. The writer has seen many contracts and other similar written statements in which this distinction has not been so clearly stated. No doubt if some of these documents were ever produced as evidence before the court the interpretation of their meaning would probably be entirely different than that intended by the various parties interested.

PROTECTION OF POLYPHASE MOTORS WITH PRIMARY RESISTOR TYPE SELF-STARTERS

When using primary resistor type self-starters special attention should be given to the selection of appropriate devices for the protection of the motor against overload and single-phase operation since with this form of starter considerable more current is drawn from the line than when using a compensator type starter under similar operating conditions. The problem of protection with this form of starter is practically the same as that in connection with polyphase motors which are subjected to full line voltage during the starting period. In either case there is a considerable difference between the starting current and the normal full load current drawn from the line and this fact must be considered in providing suitable overload protection.

With this form of starter the motor is connected to the line in series with a starting resistor. For a three-phase motor this resistor may be divided into two or three equal sections. Three sections give the best results as one section is inserted in each of the motor leads and the starting currents in the various leads are practically balanced. When two sections only are used the currents are unbalanced and the starting torque for a given line current is less than when three sections are employed. In this case resistors are inserted only in two of the motor leads. For a two-phase motor the resistor is divided into two equal sections, one of which is inserted in each phase of the circuit.

The resistors for these starters are ordinarily provided with sufficient resistance to limit the current inrush at the instant of starting to about 250 per cent of full load current value which gives approximately 30 per cent of full load torque for starting. By permitting a larger current to flow the starting torque can be increased somewhat but at best these starters are suitable only for machines such as pumps or fans which require only a light starting torque.

Since with these starters the resistors are in series with the motor at starting the line current is of the same value as the motor current whereas with a compensator type starter the line current is much less than the motor current due to the transformation in the coils of the compensator. The use of resistor type starters is therefore to a certain extent also limited by the character of the circuit from which the motor is supplied. They should not be used where heavy starting currents will seriously affect the voltage regulation of the system.

The difference in the current drawn from the line by the resistor type starters as compared with the compensator type starters for two different values of starting torque is shown in the following table applying to a 20 h.p. three-phase motor.

COMPARISON OF STARTING CURRENTS
Per Cent of Full Load Currents Drawn from Line

	At 100 per cent full load torque.	At 40 per cent full load torque.
Compensator type starter	260	104
Resistance type starter balanced resistors	380	240
Resistance type starter unbalanced resistors	475	375

The connections of a typical resistor type starter are shown in Fig. 1. It will be noted that no features for overload protection are provided. This is common practice so it is necessary to use some suitable device external to the starter. Since the protective device must be external to the starter it is evident that it will handle the starting current as well as the running current. Therefore fuse protection will be unsatisfactory since a fuse which is large enough to handle the starting current will be too large to give proper overload protection. It is therefore necessary

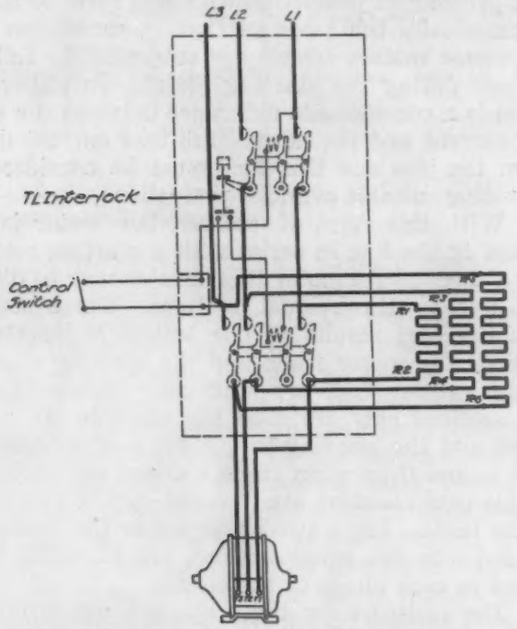


Fig. 1—Connections for typical resistor type self-starter with three-section resistor to give balanced starting conditions. Function of the time-limit interlock is to regulate interval of time between closing of upper or line contactor and lower contactor which when closed cuts out the resistor section in each leg and throws motor directly on line.

to provide some overload device having time limit features such as an automatic oil circuit-breaker or its equivalent. The coils should be set to trip at 25 per cent overload for 40 degree rated motors or at 10 per cent overload for 50 degree or continuous rated motors.

Trip coils set to operate at these values will also prevent single-phase operation since a three-phase motor operating single-phase will take approximately 175 per cent of the corresponding three-phase current. Hence, any device which will limit the load to 25 per cent will also prevent single-phase operation. Two-phase motors will similarly be protected against single-phase operation.

Since the operating coils of the contactors used on these automatic starters are connected directly across one phase of the system they will open on failure of voltage, therefore they provide under-voltage release protection, that is, after a failure of voltage, the motor will automatically start upon return of voltage.

While the discussion given here applies in particular to self-starters it is also applicable to manually operated resistor type starters. With either manually or automatic starters it is apparent that suitable protective devices should always be provided. Especially is this true in connection with the latter type which are usually installed in out-of-the-way places where the equipment receives very little attention.

EXPERIENCE WITH DOMESTIC DEVICES IN INDUSTRIAL PLANTS

In these days of "speeding up" in industrial plants, many electrical fittings, appliances and equipments are being subjected to unusually severe operating conditions. As a result, much experience as to the adaptability of any particular device or piece of apparatus for a given service is being accumulated. Many devices which have been recently placed upon the market are really being given genuine service tests of the most exacting kind. One fact in particular is being learned, and that is, that many of the electric fittings and devices which have proven generally satisfactory for office, domestic and similar use are not suitable for the severe service in industrial plants. Further, that there is absolutely no economy in using devices of this character just because their first cost is considerably lower than devices designed especially for the severe service found in industrial plants. Several interesting experiences which support this theory have come to the writer's attention during the past few weeks.

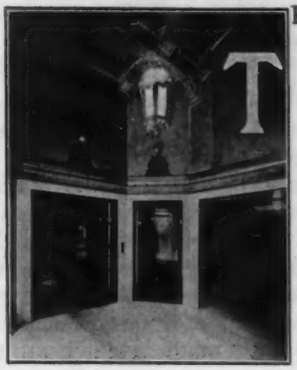
Of these, the most interesting, and the one which perhaps best illustrates the points just given, is in connection with a number of automatic starters installed in a large manufacturing plant for the control of miscellaneous motors driving machine tools, and for other purposes throughout the plant.

These automatic starters were installed specially to eliminate the troubles frequently experienced with manually-operated starters handled by inexperienced or careless help. These starters are operated in the usual manner from push button stations consisting of two-circuit switches of the momentary contact type. Originally, switches of the ordinary type, such as would be used in offices, residences or similar work, were installed. These switches, as would be expected, were found entirely unfit for this class of service. Many of them gave out in less than ten days. Now, all are being replaced as rapidly as possible by control stations of the type especially designed for use with control devices of this character.

It is needless to say that the cost of replacing the original switches and the delays resulting from their frequent failures would more than offset the extra expense of providing the proper type of switch originally.

THE NEW SOUTHERN CALIFORNIA EDISON BUILDING

(A new idea in office buildings as worked out in the new home of the Southern California Edison Company. A brief description of the layout and the organization of office force and management.—The Editor.)



The vestibule of the new building

THE new twelve story Edison Building, at the southwest corner of Broadway and Third streets, Los Angeles, is said to be the largest and most complete office building west of Chicago, devoted exclusively to the uses of a single organization. The entire general office force of the company is now in its new home, and has settled down to work under conditions which are the acme of present day completeness.

Efficiency is the dominant feature of the entire plan of The Edison Building. On each floor and through each department the demonstration of how construction and arrangement tend to conserve time and labor, and to provide convenience and speed in the transaction of business, is obvious. The open office is a characteristic of the general plan. Each of the large departments occupies an entire floor, the only closed office being that of the executive in charge. The offices of these executives are only divided by glass partitions. The head of each subdepartment has desk space in the open. One side of the floor is occupied by these departments, and the other is used by the stenographic and filing force. The stenographic work is under the direction of a chief who assigns stenographers to take the correspondence of the various departmental heads, as their work demands. All filing is turned over to the filing clerk, a general filing system obtaining. This plan saves much time and prevents confusion, in the absence of any particular person—all working upon one general system, are consequently familiar with and prepared to step in and do the work of any department.

The typical executive office keeps to the ideal of efficiency and the "out in the open" policy. Executive offices have glass partitions and all lesser desks are located in the open floor space of the departments.

The New Edison Building occupies 120 feet on Broadway and 194 feet on West Third Street, which is in the heart of the down town center of Los Angeles. The main building which towers twelve stories high is of steel frame, thoroughly fireproofed by concrete. The floors, partitions, and walls are of reinforced concrete; the exterior is after the ornate Spanish Renaissance architecture, the face being of variegated tapestry brick and old ivory terra cotta. The entrance is on West Third Street. It has a handsome marble vestibule and lobby, the style and finish being carried out in each of the eleven landings above. Three high speed elevators serve the requirements.

The library contains a large collection of technical works and files of current electrical magazines. It is open for the use of employes at any time.

The offices are divided between the different floors, the directors' rooms and legal department occupying the twelfth floor and the other offices successive floors below. Subsidiary companies affiliated

The New Edison Building is said to be the largest office building west of Chicago devoted exclusively to the uses of a single organization. Three hundred and five of the 3,350 employes of the company are in this general office building. The officers of the Los Angeles district with some 187 employes remain in the Old Edison Building.

with the Southern California Edison Company also have offices in this building.

A very handsome library which contains a large collection of technical works and files of electrical magazines, has cosy quarters on the third floor. The library is open for the use of employes and is provided with current literature. On this floor is the telephone exchange and the center of the private telephone lines of the company which extend all over the system, and from which also are operated one-table switchboards which are placed upon each of the principal floors. On the Broadway side is the assembly room, and a rest room for the women employes. In the Broadway and Third Street corner of the second floor is located the appliance display room which is one of the handsomest rooms in the building. The stenographic department occupies the opposite corner of the second floor, and is devoted to the stenographic work of the auditor as well as special work for the other departments. In the basement are the large vaults for the storage of the very numerous records and documents of the company. A special burglar-proof vault is provided for the more valuable documents.

THE MERCHANDISING OF WATER HEATERS

(A portion of the report of the electric range committee of which W. R. Putnam is chairman, as it was presented at the Portland Convention of the Northwest Electric Light and Power Association. The value of the load to central stations, methods of merchandising and experience in the type of heaters advisable.—The Editor.)

Even with the comparatively recent development of water heaters, reports indicate that the average annual maintenance cost per heater only amounts to approximately $1.00 per heater per year. Only two companies report costs in excess of the above amount, one reporting $1.50 per heater and one $2.00 per heater.

With constant improvement in design of water heaters to meet various conditions, indications are that maintenance charges will eventually become relatively unimportant.

Reports indicate that so far the cost of maintenance of water heaters has been absorbed by the central station and manufacturer. Only two companies report that customer pays for maintenance.

Effect of Lightning.—Very little trouble has been experienced with lightning due to the fact that a water heater is undoubtedly one of the best grounded pieces of apparatus known. A carefully grounded neutral should practically eliminate trouble from this source.

The Question of Rates

Of nine companies reporting on water heating rates seven use a flat rate and two use metered rate. Of the latter, one is a combination room rate, the lowest step of which is 3½c per kw-hr., the other is a 1c rate per kw-hr. rate used by a municipal plant.

Flat rates vary from $2.50 per month to $5.00 per month, depending upon the size of heater and method of operation.

Reports of annual revenue from water heaters installed show some variations. The following are typical:

$43.20 per kw. per year.
$30.00 per year.
$30.00 for 750 watt, thermally controlled heater where range is installed.
$48.00 for 750 watt, thermally controlled heater where range is installed.
$42.00 per kw. connected per year for heater on double throw switch.
$60.00 per kw. connected per year for continuous service.
$18.00 per kw. connected.
$15.00 to $40.00 per year.
$10.00 per kw. connected.

From the above it is apparent that water heating rates by no means approach standardization as yet. Further study must be given to this subject and careful records kept for a considerable period to determine definitely as to just what rate will bring an adequate return and at the same time secure business. A meter rate rather than flat rate is preferable as it restricts the wasteful use of current. Presumably this will be somewhat lower than the electric cooking rate.

Value of Water Heating Load.—There is considerable variation of opinion as to the value of the water heating load to the central station. One company reports that on account of the increased use of a system already installed the load is very valuable. Another company reports that except for the value in securing range installations, the water heating load is a detriment.

Generally speaking, water heating should prove valuable as a revenue producing load in thickly populated districts, as in a great many such instances the heaters can be installed with very little additional investment and with no appreciable effect upon the peak load, which would require additional plant capacity.

Merchandising

Following are methods used by different central stations with regard to the sale and installation of water heaters:

List price for heater plus charge for installation.
List price for heater with no additional charge.
Sell on time payment plan.
List price for heater plus additional charge for insulation, plumbing, etc.

A number of central stations merely sell the heaters, allowing the local contractors to handle the wiring and turning the plumbing work over to the regular plumbers.

Experience in Development of Water Heaters

The ultimate goal to be desired, of course, is the production of a standardized water heater with a minimum of variations, but due to the unsettled condition of the application of electric water heating and also the variation in local conditions such a condition is impracticable as yet. Certain features of the circulating, immersion, plastic and thermal control heaters are valuable, but as stated previously, no one type is used in different sections of the country with different qualities of water with equal success.

The plastic type of heater is the more recent development in water heaters, and while it has some shortcomings, it will undoubtedly prove valuable in sections where considerable lime is encountered in the water and where the rate will justify approximately continuous service.

RAILWAY ELECTRIFICATION TO SAVE FUEL

BY W. J. DAVIS

(Some new figures on railway electrification which bring out the loss of fuel which results from the present method of making each engine a power plant in itself. Even with the most modern of steam equipment the engine is hopelessly inefficient as compared to centralized power generation. One of the most interesting of the papers presented at the recent joint meeting of engineering societies in San Francisco on the subject of Fuel Conservation.—The author is Pacific Coast Manager for the General Electric Company.—The Editor.)

Two Standpoints —

In making a study of the possibilities of conserving our available supply of fuel through the electrification of the railroad systems of the United States, there are two points from which the subject may be viewed. These are—

(1) The possible saving that may be effected by the replacement of the steam locomotive equipment now in use with electric locomotives supplied with power from modern steam-electric generating plants of large capacity, suitably located with regard to cheap fuel and water and distributing over large areas through high voltage transmission systems. (In their best use these plants would not only serve the railroads but would supply power for all purposes in the districts covered by them.)

(2) Saving to be expected by comparing the possible performances of modern compound steam locomotives using high superheat with a system of electrification and power supply as above described.

The Present Fuel Consumption —

Basing our calculations on pre-war conditions, it is found from the reports of the Interstate Commerce Commission that the total gross ton mileage movements of the railroads in the United States for the year 1914 were approximately as follows:

		Ton Miles.	Percent of Total.
1.	Bituminous coal,	166,400,000,000	15.93
2.	Anthracite coal,	38,200,000,000	3.66
3.	Railway company coal,	57,600,000,000	5.51
4.	Miscellaneous freight,	372,040,000,000	35.65
5.	Locomotives,	148,200,000,000	14.20
6.	Locomotive tenders,	74,630,000,000	7.15
7.	Passenger cars,	186,890,000,000	17.90
	Total,	1,043,960,000,000	100.00

In estimating the gross freight ton mileage, it has been assumed that the net ton mile movement of the freight alone will be approximately equal to that of the cars. This assumption applies of course only to the first four items.

With Electrification

If we assume that the complete electrification of our railroads is feasible and desirable, it is at once apparent that a considerable saving may be made in the total ton mileage shown above. In the third item of the table, Railroad Company Coal, the ton mile movement may be reduced as will be shown later on to about one-third by the greater economy of electric power generation and a still further reduction will follow due to the location of many of the central power plants near the mines and to the use of such hydro-electric power as may be available. It would appear fair to assume, therefore, that the ton mileage now required for the movement of railway company coal may be reduced to about twenty-five per cent of item No. 3, or 14,400,000,000 ton miles. The saving in this item would be approximately 43,200,000,000 ton miles or 4.15% of the total.

The sixth item, ton mile movement of locomotive tenders, may be eliminated completely, making a possible reduction of 74,630,000,000 ton miles or 7.15% of the total by the use of electric locomotives. We therefore find that the total ton mile movement of all of the railroads in the year 1914 would have been approximately 926,130,000,000 if all of the roads were electrified, a saving of 11.3%.

Fuel Consumption of Power Plants

In estimating the fuel consumption of the electric power plants required for the above movement, we can take as a basis for our calculations the results of some tests made on the Chicago, Milwaukee & Puget Sound Railroad, between Three Forks and Colorado Junction. The net energy consumption in a round trip over this section of heavy grades and curvature, using regenerative braking, was 23.75 watt hours per ton mile at the locomotive, including power required for all of the auxiliary apparatus. The energy consumption of the same train on level track of the same curvature as determined from the known train weights, profile and locomotive efficiency, was found to be 20.4 watt hours per ton mile. These results are of particular interest as they show that with electric locomotives and regenerative braking it is possible to eliminate a large proportion of mountain grades insofar as they affect the power required for moving the trains.

Assuming a transmission efficiency of 72% from the power station bus bars to the collectors of the locomotive, the energy consumption at the power house, using the larger test result as a basis, is found to be 33 watt hours per ton mile.

Kilowatt Hour Requirement

Assuming then a total ton mile movement of 926,130,000,000, the energy consumption required by complete electrification would be 30,500,000,000 kw-hr., to which should be added 20% for shifting and yard movements and additional requirements of suburban passenger service, making 36,600,000,000 kw-hrs. as the total energy consumption for the completely electrified system. On the basis of an operating economy of 1.84 lbs. of coal per kw. hour, the annual fuel requirements for electrification would be 33,700,000 tons of coal. As the actual amount of coal consumed by the railroads in 1914 for locomotive use alone, including an allowance for fuel oil on the basis of 4 bbls. of oil per ton of coal, has been found to be approximately 120,000,000 tons, the total saving to be expected in case of complete electrification would be 86,300,000 tons. This is about one-sixth of the total coal production of the United States.

With Modern Equipment

The point may be raised that the above calculations are hardly fair to the steam locomotives as we

are comparing a highly efficient modern electric generating system with a variety of steam locomotives, many of them of old and inefficient types, and that modern compound steam locomotives using high pressures and high superheats might accomplish almost as great a saving as would be obtained by electric haulage. That this can not be true is due to a number of factors inherent to the two systems, the more important of which are:—

(1) The greater utilization of the available energy in the steam by the large central power stations due to condensing operation at high vacuum and the possible use of steam pressures and superheats beyond the established practical limits for locomotives.
(2) Improvement of load factor on the power plant due to the generation of power for a large number of trains at a single plant and the use of central station power for industrial and other general purposes.
(3) Almost complete elimination of certain variable and unavoidable fuel losses inseparable from the steam locomotive. These are standby losses, waste of coal when forced draught is used and excessive radiation losses in cold weather. These losses collectively are believed to average not less than 25% of the locomotive fuel.
(4) The steam locomotive is essentially a single unit and as such must operate at a much reduced economy as compared with a central power station consisting of three to eight turbo-generators, each of 15,000 to 45,000 kw. and ten to say seventy-five boilers of large capacity. In the latter case, it is possible to operate the various elements of the plant at or near the rating at which they will give their maximum economy.
(5) By the use of CO_2 recorders, the losses due to excess of air in the combustion chambers of the boilers may be kept at a minimum in a large power plant. Close regulation of the air is impracticable on a locomotive.

The effect of these factors may be seen from the following tabulated calculations in which the economy of a large turbo-generator station operating under steam conditions demonstrated to be commercially practicable is compared with that of a high grade compound locomotive working at maximum practicable steam pressures and superheat:

CENTRAL STATION STEAM PLANT

Assumed steam pressure, lbs. gauge	300
Superheat, deg. F.	250
Vacuum (30″ Bar)	28.5″
Temperature of steam, deg. F.	672
Total heat above 32 deg. F.—B.t.u.	1345.8
Available energy per lb. of steam, ft. lbs.	340,500
Heat efficiency	33.8
Efficiency of turbine including generator losses	78%
Efficiency of boilers	75%
Thermal efficiency of turbo-generator—33.8 x .78 x .75 =	19.8%
B.t.u. per kw-hr. at generator $= \frac{3412}{.198} =$	17,230
B.t.u. per kw-hr. at switchboard allowing 2.5% for auxiliaries, etc.	17,660
Assumed load factor	50%
B.t.u. per kw-hr. output of plant at 50% load factor	21,200
Lbs. coal of 11,500 B.t.u. per kw-hr. output of plant	1.84

Assume average efficiencies of transmission and conversion from Power House to drawbars of electric locomotives as follows:

Step-up transformers	98.5%
Transmission line	95 %
Step-down transformers	98.5%
Conversion apparatus	88 %
Trolley distribution	90 %
Locomotive	88 %
Combined efficiency Power House to locomotive drawbars	63.4%
B.t.u. per drawbar h.p. hour $= \frac{21,200}{.635} \times .746 =$	25,000
Lbs. of coal of 11,500 B.t.u. per drawbar h.p. hr. =	2.17

COMPOUND LOCOMOTIVE WITH SUPERHEATERS

Assumed steam pressure, lbs. gauge	225
Operating steam temperature, deg. F.	625
Superheat, deg. F.	227
Total heat above 32 deg. F—B.t.u.	1326.6
Available energy per lb. of steam, ft. lbs.	184,500
Heat Efficiency	18.5%
Efficiency of engine (steam & mechanical)	75%
Efficiency of boilers	65%
Efficiency from fuel to drawbar = 18.5 x .75 x .65 =	9.02%
B.t.u's per drawbar h.p. hr. $= \frac{2550}{.0902} =$	28,300
Assume load factor	25%
B.t.u's per drawbar h.p. hour at 25% load factor	46,000
Assume standby and other unavoidable abnormal losses	30%
Total B.t.u's per drawbar h.p. hour	65,700
Lbs. coal of 11,500 B.t.u's per drawbar h.p. hr.	5.71

It will be seen from the above that highly efficient compound non-condensing steam locomotives of modern type operating in railway service as it exists today would be expected to use more than 2.5 times as much fuel as required by an equivalent electric system. If we assume the total fuel requirements of the two systems to be in the ratio of the estimated economies shown above with allowance for reduced ton mileage of items 3 and 6 in the ton mileage table, the saving in fuel on this basis for 1914 would be 79,400,000 tons.

Advantage with Central Power Plant

It is believed that the above comparison is conservative as no advantage has been taken of the possibilities of improvement in steam power plant economy by the use of unusually high steam pressures or superheats. There are a number of large steam power plants in this country now operating under a monthly average of less than 21,000 B.t.u's per kw-hr. at the switchboard. The assumed distribution and conversion efficiencies are also within the limits of well established conditions of design and operation.

In the steam locomotive calculations, the efficiency of the engine includes all frictional, condensation and radiation losses in the engine when operating under normal conditions. The standby losses cover the fuel required to kindle and clean fires under boilers and maintain the steam pressure when the locomotives are standing or in a condition where no steam is being used for locomotion. A small allowance has also been made for losses due to extreme cold weather and abnormal draught conditions.

In our final consideration of the possibilities of fuel conservation by electrification of the railroads, we must not overlook the fact that in large steam power plants it is feasible and often recommended to burn low grade coals, whereas the steam locomotives require the higher grades of selected lump coal. This will release a large part of our highest grade fuel which may be applied to our growing merchant marine demands and to household uses.

FOURTEEN RULES FOR ELECTRICAL CONTRACTING PRACTICE

The following Code of Practice is recommended to architects, consulting engineers, contractors and owners as well as owners' engineers, by the National Association of Electrical Contractors and Dealers, the Executive Committee of which adopted and approved it as a step toward the standardization of many practices in connection with the original contracts and those for extras which, unless definitely settled in advance, leads to misunderstanding on both sides and frequently to controversies and litigation. The National Association does not, however, attempt to bind its members to use this code, but respectfully submits same for the approval of both customers and contractors.

Rule V. Differences arising between the contractor and other parties on a contract are to be subject to, and settled by arbitration.

SAVING THE WASTE IN PENSTOCK PIPE DESIGN

BY B. F. JAKOBSEN

(Economic proportioning of penstock pipes and of transmission lines is a matter of prime importance in these days of saving the waste. Under the present conditions of national stress the problem passes beyond that of successful engineering attainment when economic problems are thus correctly handled in design to one of real war service in the saving of essential materials. The author is a well known consulting electrical engineer of Berkeley, California. —The Editor.)

It is a well known fact that the most economical penstock for a given plant is one where the diameter decreases as the thickness of plate increases, i. e., as the head increases. Prof. Melvin L. Enger (Engineering Record, Sept., 1914) and Prof. E. W. Rettger (Engineering Record, Oct., 1914) have given formulas connecting the diameter and thickness of plate with the profile of the penstock. The following method is obvious and avoids mathematical complications.

Theoretical Assumptions

We may consider the head and the amount of water as given. If the penstock is very small, the annual charge for the penstock will also be very small, but practically the entire available power will be absorbed as friction head. If the penstock is enlarged progressively, more and more power will be made available at the power house and it will be found that the annual charge per horse power gained

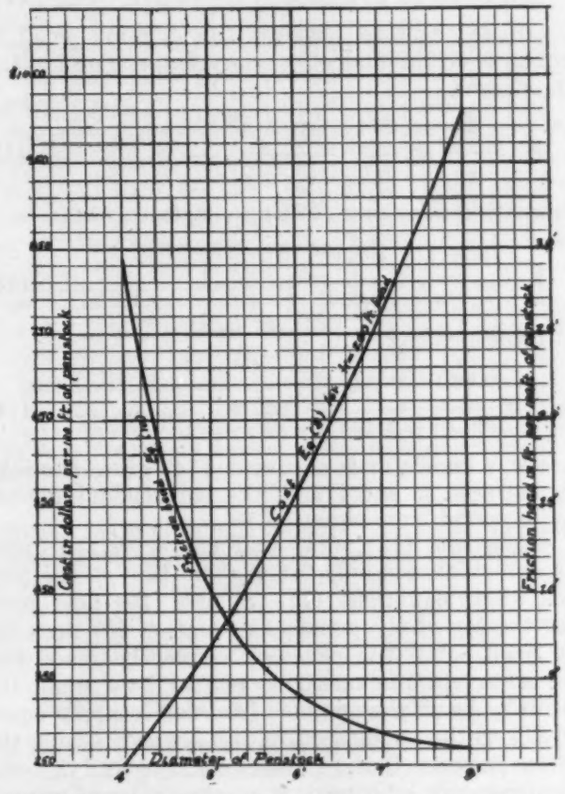


Fig. 1—With an increased size for the penstock more power is available at the power house, but the annual charge per h.p. gained also increases progressively with the penstock, thus fixing a limit beyond which it is uneconomical to go.

in this manner will increase progressively with the penstock and therefore there is a certain limit for each part of the penstock beyond which it is uneconomical to go, since further enlargement will entail a larger additional charge than the power gained is worth. (See Fig. 1.)

When considering this subject, it may be assumed that the amount of money available for the penstock has been approximately determined from the friction head and the general conditions of the entire power system, and it is required to design a penstock to fit the given profile, and such that either:

(1) With a given cost, the friction head is to be a minimum, or

(2) With a given friction head, the cost is to be a minimum.

Assume a penstock already installed; this is to be checked over to see whether or not the design is economically correct. The penstock is to be considered by itself and apart from the rest of the plant; we merely check one section of the penstock against another section.

Let c be the annual cost in dollars of one foot of the penstock at a point where the head is h feet. This annual charge would be found from the cost of this one foot of penstock multiplied by a percentage figure i which covers interest, depreciation, maintenance, taxes, insurance, etc. Let h_f be the friction head for this one foot of penstock. Also, let c′ and h'_f be the corresponding values for a penstock slightly larger in diameter and correspondingly thicker, since the stress on the steel is to be the same.

If this larger penstock had been used, there would have been a gain in power, since the friction head would be less; but the larger pipe would also have cost more. The gain in power would be proportional to the reduction in friction head and this would be $h_f - h'_f$ while the additional annual charge would be $c' - c$. The annual cost of this gain in head would therefore be:

$$k = \frac{c' - c}{h_f - h'_f} = \frac{\Delta c}{\Delta h_f} \qquad (1)$$

where Δh_f is the reduction in friction head and Δc the annual charge which this would entail. The power lost is proportional to the friction head, since the same amount of water flows through each section of penstock, but we need not be concerned with the power loss when comparing one section of a penstock with another section of the same penstock.

Values for k may now be determined for the various sections of the penstock, as per equation (1). Suppose it was found that the values k_1 and k_2 for two different points along the penstock were such, that k_1 was larger than k_2; then it would evidently pay to decrease the diameter at point 1 and increase it at point 2 and it would pay to continue this until

$k_1 = k_2$. The criterion for maximum economy in design is therefore, for all sections of the penstock:

$$\frac{\Delta c}{\Delta h_f} = k = \text{constant} \quad \text{..... (2)}$$

When designing a new penstock, we would start by selecting the diameter and the thickness of the penstock at one point; from this k could be determined. Then with this value for k the other sections could be determined and by adding all these up, the total annual cost and the total friction head would be determined. If the cost was found to be too high, all sections would have to be proportionately reduced, and vice versa.

The annual power loss due to the friction head and measured at the substation switchboard, is:

$$L = 995\ q\ e\ h_f \text{ hp. hr.} \quad \text{..... (3)}$$

when:

q = the average annual flow in sec. ft., and
e = the average annual efficiency from end of of penstock to substation switchboard.

The gain of power resulting from a reduction of friction head from h_f to h'_f is therefore:

$$\Delta L = 995\ q\ e\ (h_f - h'_f)$$
$$= 995\ q\ e\ \Delta h_f \text{ hp. hr.} \quad \text{..... (4)}$$

Since q and e are constants:

$$\frac{\Delta c}{\Delta L} = K = \text{constant} \quad \text{..... (5)}$$

Where:

$$K = k/995\ q\ e \quad \text{..... (6)}$$

K in equation (5) is an economic index, since it denotes what the cost is for the last increment of power obtained by making the penstock the size it is instead of slightly smaller. It follows therefore that K should be less than the price of power at the substation minus the cost of production from the end of the penstock to the substation switchboard. If K is larger than this value, the power gained by making the penstock larger than its economical size, costs more than it brings. It may not always be possible to keep K below its economical limiting value for every part of the water conduit or of the system, since operating conditions may impose other

A Numerical Illustration

To illustrate the above, let the cost of a steel penstock be assumed proportional to the diameter and the thickness, and let:

R = radius of penstock in feet;
t = thickness of plate in inches;
w = weight in lbs. per foot of penstock.

Add 20% for riveted joints, then:

$$w = 1.2 \times 40 \times t \times 2 \times R\pi = 302\ R\ t \text{ lbs.}$$

Let p = price in dollars per lb. of penstock installed;
i = annual percentage charge covering interest, maintenance, depreciation, taxes, etc.

The annual charge per foot of penstock is then:

$$c = w\ p\ i = 302\ R\ t\ p\ i \text{ dollars} \quad \text{..... (7)}$$

If h = head in feet acting on penstock;
s = allowable stress in lbs. per sq. in., then

$$t = 5.2\ h\ R/s \text{ inches} \quad \text{..... (8)}$$

From (7) and (8) follow:

$$c = 1570\ i\ p\ h\ R^2/s \text{ dollars} \quad \text{..... (9)}$$

Let

h_f = friction head in feet per foot of penstock;
q = flow in cubic feet per second;
v = velocity of flow in feet per second;

Let the friction head be expressed by[1]

$$h_f = \frac{0.0254\ v^{1.85}}{(2R)^{1.127}\ 64.4} \text{ ft.}$$

It is:

$$q = v \times R^2\pi$$

Eliminating v from above expression for h_f we get:

$$h_f = 0.0000217\ \frac{q^{1.85}}{R^{4.827}} \text{ ft.} \quad \text{..... (10)}$$

The values for Δc and Δh_f may be found from equations (9) and (10) by substituting a slightly larger value than R, say 1.05 R and subtracting, exactly as equation (1) was formed, but in this case, they may be more convenitntly found by differentiating (9) and (10) with respect to R since h may be considered as a constant; that gives:

$$\Delta c = dc = 3140\ i\ p\ h\ R\ dR/s$$
$$\Delta h_f = dh_f = -0.000105\ q^{1.85}\ dR/R^{5.827} \quad \text{..... (11)}$$

Δh_f is negative, because the friction head increases when the diameter decreases; neglecting this minus sign:

$$k = \frac{dc}{dh_f} = \frac{3140\ i\ p\ h\ R^{6.827}}{0.000105\ s\ q^{1.85}} \quad \text{..... (12)}$$

Eliminating h/s from (12) by equation (8):

$$k = \frac{604\ i\ p\ t\ R^{5.827}}{0.000105\ q^{1.85}} \quad \text{..... (13)}$$

and consequently:

$$t = \frac{0.000105\ k\ q^{1.85}}{604\ i\ p\ R^{5.827}} \text{ inches} \quad \text{..... (14)}$$

Since k is known or is assumed, (14) gives the relation between R and t and the corresponding head may be found from equation (8).

Equations (12), (13) and (14) give the diameter and thickness only for that portion of the penstock where equations (7), (8) and (10) hold good. Near the top of the penstocks equation (8) does not hold good, since the penstock cannot be made less than a certain thickness, no matter how small the head may be at that point. In order to apply equation (1) to the upper section, the law expressing the relation between R and t must be known and this will be independent of h until h reaches a large enough value, so that equation (8) applies. The above formulas also imply a constant value for s, but it will not pay to use all the various thicknesses of plate obtainable, and therefore s will vary somewhat.

Equations (7) and (9) are only approximations, since the weight of a riveted pipe of various thick-

[1]Unwin: A Treatise on Hydraulics, sec. ed. 1912, p. 217.

nesses and diameters is not directly proportional to the thickness of plate and the diameter, nor is the cost likely to be directly proportional to the weight. Also equation (8) is only approximately correct, since it is the strength of the joint that will control the amount of head that may be safely used. Therefore, when applying equation (1) to an actual penstock, k should be determined from the estimates, bids, etc. for each size in question and equations such as those from (7) to (14) can only be approximations.

If q varies considerably during the year, as for instance between q_1 and q_2 where $q_2 > q_1$, the value to be used for q is not $0.5\ (q_1 + q_2)$ even where the

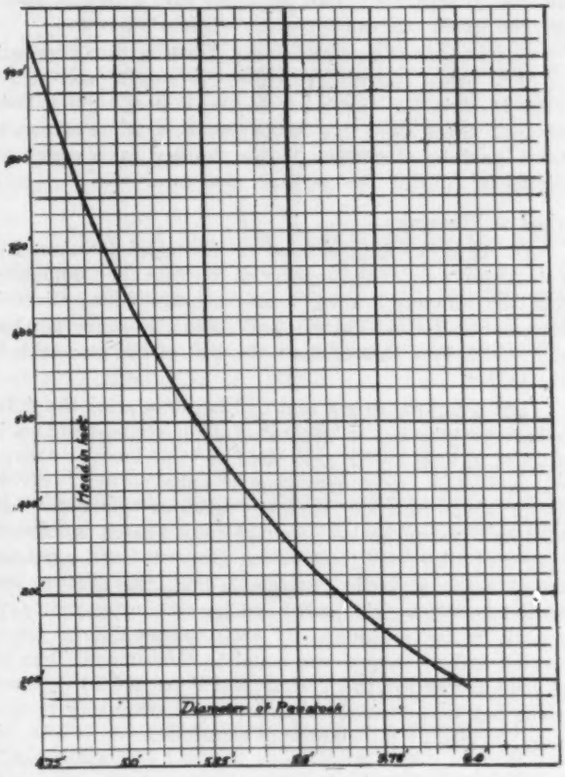


Fig. 2.—The variation of penstock diameter with the head. This is based on the assumption that the thickness of plate varies continuously as the head and diameter.

variation between q and time may be so arranged as to give practically a straight line when plotted, but the value for q must be found from:

$$q^{1.85} = 0.5\ (q_1^{1.85} + q_2^{1.85})$$

If $q_1 = 200$ and $q_2 = 400$ this would give $q = 315$.

If a straight line relation does not exist between q and time, the general formula:

$$q^{1.85} = \frac{t_1 \times q_1^{1.85} + t_2 \times q_2^{1.85} + t_3 \times q_3^{1.85} + \text{.....etc.}}{8760}$$

must be used. t_1, t_2, t_3, etc. are the hours per year during which the flow is q_1, q_2, q_3, etc."

Example: A penstock for a head of 1000′ is to be designed; let it be assumed provisionally that at the top, where h = 0 the diameter is to be 6′ and the thickness ¼″ and let p = $0.15, i = 0.16, q = 300 and as stated R = 3′ and t = 0.25″. Substituting these values in (13) gives k = 548 and then from (14) is obtained:

$$t = 151/R^{5.827}$$

This will give the correct value of R for any value of t and from (8) with s = 12,000 lbs. per sq. in. the corresponding value of h may be found. This gives:

Thickness	Radius	Head
0.25″	3.00′	192′
0.5 ″	2.67′	449′
0.75″	2.48′	698′
1.00″	2.36′	978′

The variation of penstock diameter with the head is shown in Fig. 2, on the assumption that the thickness of plate varies continuously as the head and the diameter.

In this manner the head and diameter corresponding to each thickness may be determined and the most economical penstock proportions for that particular profile may be determined. If this is found to cost too much, k must be reduced by assuming a smaller diameter at the top and the proportions and total cost determined again. It will not generally pay to use too many different thicknesses of plate or too many different diameters; calculations only can show how far it will pay to go in each case.

FURTHER STATISTICAL DATA ON POWER COMPANIES

BY W. F. NEIMAN

(In connection with the interesting compilation of comparative statistics for California power companies made by W. F. Neiman, manager of the commercial department, Universal Gas & Electric Company, and published in the October 15th issue of the Journal of Electricity, the following data will be of value. It was found impossible to include this material in the last issue but such interest has been taken in these tables, that it is here given in order further to increase the scope of their usefulness.—The Editor.)

Source of Data —

All corporations, concerns or individuals supplying electric energy to the public in the State of California, except such as are operated by municipalities, are required by the Public Utilities Act to render annual reports to the Railroad Commission of the State of California, under oath, "in which the utility shall specifically answer all questions propounded by the commission upon or concerning which the commission may desire information." (See section 29 of Public Utilities Act as amended April 24th, 1915.)

The form adopted by the Commission for these annual reports has been improved from time to time, and as at present used, calls for a mass of detailed information which if properly and carefully given by the utilities, makes a most comprehensive and valuable report. The form is divided into two parts, one which may be termed technical, and the other statistical. The data given by the utilities in the financial part is published in the Commission's Annual Reports in detail, and in table form. For a proper understanding of the information given those interested should obtain a copy of the Railroad Commission's "Uniform Classification of Accounts" for Electric Corporations.

The tables published on October 15th deal only with part of the statistical data given in the reports, and for that part, only the totals for each company. In addition to the data there given the reports include information as to plant

capacity, miles of high tension transmission lines, miles of distribution lines, sub-station and transformer capacity, meter tests, accidents, number of employes and salary and wages paid to same, all in considerable detail.

Segregation of connected load, number of consumers, and kw-hr. sold are made as to class, such as residence, commercial, industrial, agricultural, etc., as well as segregation as to cities or districts served. This is excellent, but a valuable addition would be a segregation of this data to correspond to the financial classification of revenue, or else a segregation of revenue in accordance with the classification of the statistical information, or some compromise that would tie the two together.

Total Revenue for 1916 —

The totals for the sixty-one incorporated electric companies for the year 1916 as given in the Commission's annual report is as follows:—

Total Operating Revenue "Electric"	$33,910,859.68
Total Other Operating Revenue	572,958.30
Total Operating Revenue,	$34,483,817.98

(For the detail amounts under each sub-division and each company, see Railroad Commission Annual Report wherein will be found also the detailed operating expense accounts and other interesting information.)

Two of the Class "C" companies reported no revenue (the Consolidated Electric and the California Electric Generating Company), the operation of which is handled by the Great Western Power Company and the City Electric Company, and included in those companies' reports; and one Class "C" company's report was incomplete, namely, the Ojai Power Company.

In connection with the statement that the twenty-five companies listed represent 98.2 per cent of the total operating revenue "electric" of the sixty-one incorporated companies for the year 1916, it should be noted that the total for the twenty-five principal (Class A) companies listed in the table for the year 1916 is as follows:—

Total Operating Revenue "Electric"	$33,291,325.75
Total Other Operating Revenue	538,574.62
Total Operating Revenue,	$33,829,900.37

Municipal Companies —

The municipal light and power companies report to the State Controller, who publishes the results in his annual report of Financial Transactions of Municipalities and Counties of California, a very interesting volume containing much information relative to the varied operations of cities and counties (copies of these reports may be obtained by addressing the State Controller at Sacramento). The reports of the Municipal Light and Power Companies are for the fiscal and not the calendar year and the figures given are obtained by adding the two fiscal years, dividing by two, and assuming this to represent the calendar year 1916. The equivalent "total operating revenue electric" for municipal companies for this year was $829,887.31.

Figures of Growth —

Among the names of companies acquired by other companies were—

Company.	Acquired By	Date.	Total Operating "Elect." Rev. previous year.
West Sacram'to Elec Co.	Pacific Gas & Elec. Co.	1915	$ 21,876.71
United Light & Pwr Co. and Central Oakland Lt. & Pwr. Co.	Grt. Western Pwr. Co.	1915	257,553.38
Consumers, Southside & Equitable L. & P. Co.	City Electric Co.	1915	229,931.63
Legrange Div. Yosemite Pwr. Co.	Sierras & S. F. Pwr.Co.	1917	71,113.93
Tulare Co. Pwr. Co.	Mt. Whitney Pwr. & Electric Co.	1915	143,190.84

Resale of Power —

It will be noted in the tables that the second column contains the revenue derived from the sale of current to other electric corporations for re-sale. The purpose of this is to indicate the proportion of wholesale business done by each company listed. It will be noted that the entire revenue of the Snow Mountain Water & Power Company is included in this column. In their report this company lists their entire revenue as "Commercial Power metered," and it so appears in the annual report of the Railroad Commission. However, as a matter of fact, five of the six consumers of this company are public utilities engaged in supplying electric current to the public, and purchase all or part of their current from this company for re-sale. What business the sixth consumer is engaged in is not apparent from the Snow Mountain Water & Power Company's report. As the revenue of this consumer could not be separated from the other five, with this data at hand, the whole was considered as wholesale power.

The amount shown under the Oro Electric Corporation as sold to other electric companies for re-sale was sold by the Oro Electric Corporation to the Oro Water, Light & Power Company. Since these two companies were taken as one, the amount paid by the latter to the former for current was deducted in figuring the average rate received.

Method of Figuring —

All the other data entered in the tables is taken from the statistical part of the reports on file with the Commission, except the columns headed, Loss—Average Rate—Diversity Factor—Annual Load Factor—and Annual Revenue per Consumer, which were figured from the rest of the data included in the tables.

Loss is figured in per cent and is the relation the difference between total kw-hr. generated and purchased and kw-hr. sold bears to total kw-hr. generated and purchased. Average rate received is "total operating revenue electric," divided by kw-hr. sold. Diversity Factor is taken as "connected load" divided by "system peak." Annual Load Factor is taken as the per cent which the total kw-hr. generated and purchased bears to assumed kw-hr. represented by the system peak maintained continuously each hour for the entire year (system peak in kw. multiplied by 8750 hours—if total kw-hr. generated and purchased was equal to this amount then the total load factor for the system would be 100%). Annual Revenue per Consumer is taken as "total operating revenue electric" divided by the number of consumers.

Variability in Figures —

The connected load was given by some companies in hp. but by the large majority in kw. Those given in hp. were converted to kw. by multiplying by 746 watts and dividing by 1000 watts. Where fractions of a kw. resulted or were given the nearest whole number was taken.

It will be noted that the diversity factor varies greatly. This is due, in most cases of large variation, to the company giving the demand of its large consumers (such as "other electric corporations" and "electric railways") as the connected load of such consumers—this naturally makes the resulting diversity factor smaller.

Some companies report actual number of consumers (not meters), such as the Pacific Gas & Electric Company, Great Western Power Company, City Electric Company and Universal Electric & Gas Company. Others consider each meter as a consumer, such as the Southern California Edison Company, Los Angeles Gas & Electric Corporation, and Santa Barbara Gas & Electric Company, and the others do not state which is taken, but from the number given it would appear that the majority of the companies consider each meter a consumer. In 1916 the Pacific Gas & Electric Company reported 178,630 consumers and 186,963 meters.

SPARKS—Current Facts, Figures and Fancy

(A new method for spinning glass in endless lengths promises to provide a new type of insulation. After-the-war trade is being planned for in both Japan and Germany. Concrete freight cars are following after concrete ships. In every line of industry advance and changes are reflecting the spirit of the day.—The Editor.)

The United States is second to Canada in supplying farm machinery to Australia. $10,000,000 worth is required annually by Australian farmers, of which $7,000,000 worth is manufactured at home and $4,000,000 worth imported.

* * *

The importance with which the telephone in forest work is regarded by government officials is demonstrated by the fact that 3600 miles of telephone lines have been constructed in the national forest of Oregon and 1600 miles in the forests of Washington.

* * *

A new use has been discovered for the vacuum cleaner. Mr. Stanley Smith, of Cincinnati, uses it to pick the potato-bugs off of his war garden potato patch. A long feed wire carries the current out to the back yard and it takes just a few minutes to collect a thousand or so bugs.

* * *

There is not much music in a boiler-factory, but the question is debatable since the riveting machine is now part of Sousa's band. An electric hammer, mounted on a square steel plate, supported on springs over a wooden base, is used by Sousa's band in rendering a ship-builders' march, "Volunteers." The adjustment can be tuned to a high shrill pitch, or to a low dull one.

* * *

The Department of Agriculture and Commerce of Japan has decided to build a National Industrial Laboratory at Osaka. The laboratory will be similar to one in Tokyo and aims at the study of technical questions as presented by the public. The project is no doubt an opportune one as Osaka is the center of manufacturing in Japan and had long demanded this kind of laboratory.

* * *

Dr. A. D. Waller is studying what he calls the "emotive response" or "psychologalianic reflex" on various individuals. By means of galvanometric measurement of an electric current from two battery cells sent through the palm of the subject's hand, he determines the emotive response to different emotional experiences. This test may be of value in the selection of air pilots, and in the treatment of 'nerve' cases on the battle field.

* * *

The war is making changes in the composition of glass bulbs for incandescent lamps that will eventually lower the cost of the finished lamps. The percentage of potash used has been greatly reduced and lime-glass bulbs, made by automatic machinery, are being substituted for the hand blown lead-glass, thus using the economical large-tank melting process instead of the small-tank process employed for lead-glass bulbs. The speed of production is greater with the new bulbs, and the product itself has proved highly satisfactory.

* * *

The American glass spinners could make spun glass in pieces no longer than the circumference of the wheel on which it was worked, but a New York manufacturer has found a way of making it in endless lengths. There is a great demand for the new product, for weaving fireproof curtains, hanging and draperies, for light-diffusing cloth in moving picture studios, for non-conducting plates for storage batteries, for insulation of all kinds. It is even useful in the chemical field, where glass plates are used for the filtration of acids.

* * *

Along with the experimenting on concrete ships has gone the investigations with reinforced concrete freight cars. The war is demanding more carriers and, with the same breath, the conservation of steel, and so it seems imperative that the concrete cars be substituted. If they are successful, they will have several advantages over the steel cars—they will cost not more than one-half as much, they can be more quickly built, and they can be more easily repaired. Furthermore, the adoption of the concrete car would release many skilled workmen for shipbuilding. The one objection still to be overcome is the extreme weight of the concrete car, but the experimenting engineers feel confident that success is assured.

* * *

The Welthandel records that the "Deutscher Uberseedienst" (German Oversea Service) has increased its capital from 1,900,000 marks to 5,000,000 marks by way of preparation for the economic struggle that will arise after the war. The society is the center of a general organization sustained by private initiative and having for its object the development of relations with foreign countries, so as to build up German commerce and German prestige throughout the world.

* * *

Mixing dry colors in ready mixed paint with the ordinary paddle to get the desired shade is a decidedly tedious job and unless thoroughly mixed will be streaked and spotted when applied with a brush. A much quicker method of accomplishing the mixing, according to Popular Science Monthly, is to use an egg beater, which also eliminates the skin and other foreign matter from the liquid.

PERSONALS

A. E. Chandler, president of the California Water Commission, has been elected president of the San Francisco Engineers' Club for the ensuing year. During recent months the San Francisco Engineers' Club, which now includes over 425 names, has contributed a notable array of engineering and executive talent to the service of the nation. Herbert Hoover, National Food Administrator, is a charter member. Thirty-six of its members now hold distinguished commissions in the national army, among whom may be mentioned Lieutenant-Colonel J. G. Schrugham and Majors George L. Dillman, J. D. Galloway and A. H. Griswold, the last mentioned member being now in charge of telephone communications for the American Expeditionary Forces. Mr. Chandler, the new president of the club, is one of our best known writers on western water law and has had a wide and successful engineering career in many districts of the West, serving in various capacities as irrigation engineer, university professor and water right specialist. It is confidently believed that the Engineers' Club in San Francisco, under the able direction of Mr. Chandler, enters upon a new era of prosperity and usefulness to the West.

Frank Stowe has been appointed as Instructor in Electrical Work at the University of California.

Louis Trane, an electrical engineer of Petrograd, arrived in San Francisco recently on his way back to Russia after spending some two years in the United States.

R. F. Irvin has been appointed as assistant to L. D. Calhoun, the advertising manager of the Square D Company of Detroit, manufacturers of Square D Switches.

Roscoe F. Oakes, general manager of the San Francisco office of the National Carbon Company, in company with his wife is spending several weeks in eastern centers.

P .H. Booth, Pacific Coast sales manager, and **Lewis H. Mertz,** advertising agent of the Edison Electric Appliance Co., Inc., with headquarters at Ontario, California, are two recent visitors in San Francisco.

Arthur P. Allen, chief engineer of the Union Iron Works Company at San Francisco, has been summoned to Washington, D. C., there to remain indefinitely in the service of the United States Emergency Fleet Corporation.

C. N. Cross, assistant professor of mechanical engineering at Leland Stanford Junior University, is again at his university duties after spending the summer months in service of the California federal fuel administration.

Arthur W. Nye, professor of electrical engineering at the University of Southern California, is for the present in the Ordnance Department of the United States Army at Washington, D. C. He will remain at Washington during the period of the war.

J. G. Scrugham, formerly professor of mechanical engineering at the University of Nevada and State Engineer, has been promoted from the rank of major to that of lieutenant-colonel in the Ordnance Department of the United States Army, stationed at Washington, D. C.

B. D. Dexter has resigned his position on the engineering staff of the California Railroad Commission and is now with the Pacific Gas & Electric Company with headquarters in San Francisco, serving as assistant engineer to E. H. Steele on transmission line construction.

Guy W. Talbot, president of the Pacific Power & Light Company, with headquarters at Portland, was one of the leading spirits of the recent Liberty Loan drive in Oregon and to his able effort is due much of the splendid accomplishments of the Fourth Liberty Loan drive in that commonwealth.

T. E. Bibbins, president of the Pacific States Electric Company, has left for the East to attend the War Service Convention of the Electrical Supply Jobbers' Association. Since leaving, however, the convention has been indefinitely postponed on account of the prevalence of Spanish influenza.

J. F. Fenwick, secretary and assistant manager of the Hawaiian Electric Company, Ltd., of Honolulu, T. H., is a recent San Francisco visitor. Mr. Fenworth recently addressed the San Francisco Electrical Development League and brought warm greetings from our electrical neighbors in the tropics.

C. L. Cory, professor of electrical engineering at the University of California, is again at his duties in Berkeley after an absence of several months in the East in New York City, during which time he has been engaged in war work as assistant director of Electric Power Supply under H. L. Jackling.

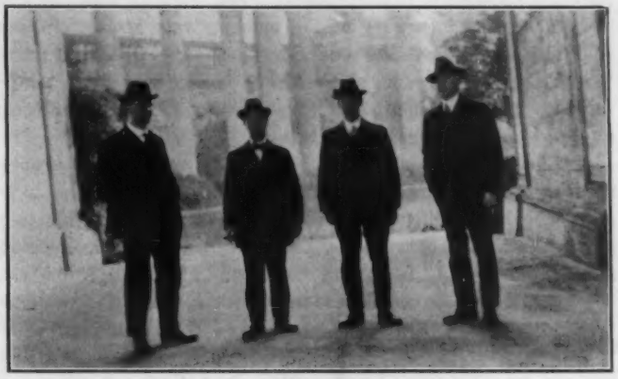
C. B. Faulkner, manager of the Olympia Light and Power Company, who was recently elected president of the Northwest Electric Light and Power Association at the Portland convention, has found it necessary to decline the honor in view of the pressing duties of other work. The appointment of his successor has not yet been announced.

W. R. Putnam, sales manager of the Utah Power & Light Company with headquarters at Salt Lake City, was director of publicity for the Fourth Liberty Loan in the State of Utah. Mr. Putnam's ability in publicity lines undoubtedly was one of the leading factors that aided in the splendid showing made by that commonwealth in the recent drive.

Nion R. Tucker has been elected a director of the Pacific Gas and Electric Company to take the place of **Capt. Norman B. Livermore,** recently resigned. Captain Livermore was one of the first to volunteer for active service after the United States entered the war. He is now serving as a captain of engineers on the French front. At the time of his departure he left his resignation in the hands of President Frank G. Drum, and at a recent meeting of the board of directors the resignation was formally accepted. Mr. Tucker, who succeeds him, is prominently identified with the business community in San Francisco.

J. M. Wadsworth, state administrative engineer for the California Fuel Administration, is contributing able and efficient service to the West. Under the authorship of Mr. Wadsworth the United States Bureau of Mines, which has loaned Mr. Wadsworth's services to the Fuel Administration, has just issued a handbook for boiler plant and locomotive engineers entitled "Efficiency in the Use of Oil Fuel." The handbook is 5 by 7 inches and contains eighty-five pages of excellent data connected with fuel oil economy in addition to a number of helpful charts and insert diagrams. The book may be had free upon application at the offices of the California Fuel Administration. Instances such as this demonstrate the splendid spirit of cooperative helpfulness that has been inaugurated in the various offices of the Fuel Administration throughout the West, supported by the technical specialists of the Bureau of Mines.

R. Boan, engineer of tests, **E. W. Arthur,** assistant manager, and **F. J. Shea** of the mechanical branch of the Victoria Government Railways of Melbourne, Australia, are recent San Francisco visitors, as announced in the last issue of the Journal of Electricity. They are making a tour of the United States to get in touch with American railway practice in the



interests of Australian railways and have just now arrived on the Pacific Coast en route east. The arrival of these men from Australia is but typical of the recent groups of investigators along engineering lines that have come to Pacific Coast ports, especially from the Far Eastern ports of China, Japan, Australia and Siberia. Much good in developing a closer understanding and community of interest is expected to follow from these friendly visitors. In the picture from left to right, are F. J. Shea, R. Boan, E. W. Arthur and A. V. Thompson, San Francisco manager, electric railway supply department of the General Electric Company.

John R. Brownell, superintendent of safety of the State Industrial Accident Commission, announces that the Committee on Tentative Electrical Station Safety Orders has submitted for adoption by the commission a revised set of safety orders based on the electrical station section of the National Electrical Safety Code of the United States Bureau of Standards.

H. A. Lemmon, salesmanager of the Truckee River General Electric Company with headquarters at Reno, Nevada, is a recent San Francisco visitor. Mr. Lemmon is proving out his unusual executive ability in his state by serving as Food Administrator and a state member of the Liberty Loan, Red Cross and Y. M. C. A. committees that are doing such effective work.

J. W. Swaren, formerly hydraulic engineer for the Pelton Water Wheel Company but now a major in the engineer corps of the United States Army, has recently returned from France to San Francisco, awaiting a new assignment of duty. In his four months active service in France, having in charge certain features of the supply work, Mr. Swaren traveled a total distance of over thirty thousand miles on French soil.

Clark H. Minor, general manager of the recently organized China Electric Company, Ltd., recently visited in Shanghai in connection with the plans of his company to engage in the manufacture of electrical materials. The China Electric Company is a combination of American, Chinese and Japanese capital formed by the Western Electric Company of America, the Nippon Electric Company of Japan and the Ministry of Communications at Peking.

W. L. Goodwin, originator of the Goodwin Plan and for years a resident of the Pacific Coast, is now carrying his ideals into foreign lands. On October 4, 1918, a banquet was given in honor of Mr. Goodwin by the Toronto Section of the American Institute of Electrical Engineers at which Mr. Goodwin explained to an appreciative audience the prime points of importance in his ideal for harmonizing the various branches of the industry.

M. M. O'Shaughnessy, city engineer of San Francisco, is now in Washington prepared to make a showing on what the city can do if funds and materials are available for rushing construction. It is the city engineer's belief that within three years' time the city can be furnishing an enormous development of hydroelectric energy that will very materially assist in carrying on development that is expected to follow the termination of the war.

John A. Britton, vice-president and general manager of the Pacific Gas & Electric Company, in a recent Liberty Loan talk before the San Francisco Ad Club is thus described in the Ad Age:

"The net result of the talk that John A. Britton gave at the luncheon last Wednesday was $12,000 for the Liberty Loan and a renewed enthusiasm amongst those who were fortunate enough to hear him speak. Familiar as we are with the war story, he brought it out in a new light and the intense, burning vigor behind his words drilled the message home with unusual force. The enthusiasm he aroused was not of the hand-clapping variety, either; witness of which fact lies in the records of $10,000 worth of subscriptions being handed in in some fifteen or twenty minutes."

John G. Hatfield, who left the engineering staff of the San Joaquin Light & Power Corporation last August, where he was engaged on a surveying crew in the Kings River Canyon, to attend the students' training school at the Presidio in San Francisco, has gone to Fort Hancock, near Augusta, Ga., where he has been assigned to train for a commission in the machine gun corps of the United States Army, the commission to be granted three months hence. Mr. Hatfield is a son of Henry R. Hatfield, dean of the College of Commerce at the University of California, who is now director of the Bureau of Statistics and Planning for the War Industries Board at Washington. Young Hatfield is but eighteen years of age, has made an enviable record in scholarship at the State University and carries with him a host of good wishes for success in the patriotic service he has entered.

OBITUARY

Mathias Klein, the founder of the well known firm of Mathias Klein & Sons, manufacturers of telegraph, telephone and other linemen's tools, closed his career on Sept. 28th, passing away at the ripe age of ninety-two. In his decease the industry loses a pioneer in the development of tools for the lineman and electrical mechanic.

A. R. Thompson, captain in the Engineer Officers' Reserve Corps and formerly an engineer in the distribution department of the Pacific Gas & Electric Company, was killed by accident at the front recently while riding in an automobile that was precipitated suddenly into a shell crater.

Captain Howard Clifton McCall, son of the president of The Philadelphia Electric Company, was killed in action on July 20th, 1918, after having been in service in France less than three months. Captain McCall went to the Officers' Training Camp at Ft. Ogelthorpe, Ga. The passing of this young man, a brilliant graduate of the University of Pennsylvania with the class of 1913, is typical of that splendid manhood that the utility life of the nation is giving that democracy bay not perish from the earth.

Mr. L. Joseph, the president of the Russian allied house of the Western Electric Company, Heisler & Company, was killed some time during the month of July. The cause of the murder is not known. Mr. Joseph had no enemies, and was a very quiet man, who was entirely absorbed in the management of the factory. He had only a superficial interest in politics, and was far removed from a participation in the many counter-revolutionary movements.

MEETING NOTICES FOR ELECTRICAL MEN

(The effect of the influenza epidemic is shown in the general postponement of meetings during the past two weeks. Several important gatherings in Portland, however, election of officers by the California Association of Electrical Contractors and Dealers, and a most successful meeting of the San Francisco Development League are the events of the fortnight.—The Editor.)

Meetings Postponed

Among the meetings postponed or called off in compliance with rulings of the Board of Health in view of the Spanish influenza situation were the following:

The San Francisco Section of the A. I. E. E. had planned a meeting for Friday evening, October 25th, in the rooms of the Engineers' Club, Mechanics Institute Building. The subject was to have been "Unification of Manual and Automatic Telephone Systems at Los Angeles," by Mr. D. E. Wiseman, Equipment Engineer, Pacific Telephone & Telegraph Company. However, it was found necessary to call off the meeting at the request of the Board of Health.

Luncheon meetings of the San Francisco Development League have been given up until further notice from the Board of Health justifies their renewal.

Announcement has come from the Electrical Supply Jobbers' Association that, due to the epidemic of influenza, the advice of medical authorities against holding conventions while the disease is epidemic, and as the State of Ohio has ordered postponement of conventions for three weeks, the Jobbers' meeting called for Cleveland, Ohio, October 21, 22 and 23, 1918, is indefinitely postponed.

Oregon Society of Engineers

A meeting was held at 8 p.m. Monday evening, October 7th, 1918, on the eighth floor of the Oregon Building, Portland, Oregon.

The speakers of the evening were Mr. Mehren, editor of Engineering News-Record, who spoke on the Engineer's Part in Systematizing Government Production including both engineering education, efficiency and labor, and Mr. Nathan A. Bowers, who spoke on the Engineers' Club of San Francisco.

Joint Meeting of the N. E. L. A. and A. I. E. E., Portland, Oregon

The regular monthly meeting of the local section of the N. E. L. A. and the A. I. E. E. was held in the assembly room of the Multnomah Hotel, Tuesday evening, October 8th, at 8 p.m., H. H. Schoolfield acting as chairman of the meeting.

The chairman of the program committee stated that the activities of his committee would be centered around the one task of getting the membership better acquainted. The chairman of the membership committee reported that they were arranging to give a prize for the member obtaining the greatest number of new members.

The first speaker of the evening was Mr. W. L. Findley, Game Warden of Oregon, who spoke on Oregon Fish and Birds, illustrating his talk with motion pictures of actual fish and bird life taken by himself.

The second speaker of the evening was Major William A. Welch of the Spruce Production Division. He said in part:

Early experiments showed that spruce was more adaptable to the construction of airplanes as it is light, strong and possesses a wonderful fibre.

The old methods of sawing and handling were not proper for airplane use. Automobile body builders were the only ones who had had previous experience in handling this line of material. In consequence, they were used as a nucleus to start from.

When the spruce department first started their operations on the coast they were hindered by the I. W. W.s and they had to be cleaned out before production could go ahead.

The spruce lies in a strip of land along the coast approximately 400 by 50 miles and only six railroads were available in this district. Also the water transportation was very limited. Consequently the only way to get out the spruce for the Allies demands was to "rive" it in the woods. If this had not been done we would never have been able to have turned out the "training planes" for use this last summer.

In order to improve transportation facilities, it was necessary to construct 13 railroads after a thorough cruise and estimate of the timber was made. Up to the present time 173 miles of main line and 200 miles of spurs have been constructed. This taps approximately two billion feet of spruce lumber.

Under old methods the airplane factories received approximately 120 feet of clear lumber from every 1000 feet rived. Under improved methods and by educating the men in the woods and mills, 290 ft. per 100 ft. rived is made into airplane stock.

To speed up production a "cut up" mill at Vancouver, Wash., was built by the army in 45 days, with a capacity of 400,000 feet per day.

After conclusion of the talk motion pictures were shown descriptive of the airplane manufacture in the Wright Plant at Detroit, which proved to be very instructive. Following the talks a "buffet" lunch was served.

The next meeting will be held on November 12, 1918, and will be addressed by Col. Geo. A. Zerins of the U. S. Army Engineers.

American Society of Mechanical Engineers

The Council of the American Society of Mechanical Engineers was to have met in Indianapolis, Indiana, on Oct. 25th and 26th, 1918, and in connection with this meeting an

BUILDERS OF THE WEST—XXXIX

MAJOR-GENERAL GEORGE W. GOETHALS

The Panama Canal—the linking of the Old with the New—has made possible the building of a greater West, a West with sympathetic touch in the commerce and engineering of the world to a degree undreamed of by the former builders of this vast empire. To Major-General George W. Goethals, this issue of the Journal of Electricity is dedicated, not only because of his wonderful achievement in handling and overcoming the physical barriers of nature but also for the splendid ideals of constructive organization he inaugurated that have set new records in handling the human factor in vast engineering endeavor.

elaborate gathering of the Indianapolis, Cincinnati, St. Louis, Chicago, Milwaukee, Detroit and Cleveland sections had been arranged. The Indiana Engineering Society, the Indianapolis-Lafayette section of the American Institute of Electrical Engineers and the Indianapolis section of the American Society of Automotive Engineers had also been invited. Word has not been received whether the Spanish influenza prevented the gathering.

The program called for a Symposium on Fuel Conservation, a Symposium on Research, an Exhibition of the Liberty Motor and informal entertainment features.

Toronto Section, A. I. E. E.

At a recent meeting held on Friday, October 4th, the Toronto section of the A. I. E. E. instituted a new kind of program. A general discussion on The Grounded Neutral in Transmission and Distribution Systems filled the evening and the points discussed comprised the value of the ground connection with and without resistance or reactance, the number of grounds advisable, etc. On the other hand there was much to be said for the delta connection.

These points were enlarged upon by Mr. H. C. Don Carlos, Mr. Paul Ackerman and Mr. D. A. McKenzie, and the discussion was then free for all.

The San Francisco Development League

A tremendous program for the development of electrical energy in Northern California, already recommended to Washington, was outlined by Major George F. Sever, special representative of the War Industries Board at a luncheon given by the Electrical Development League in the Palace Hotel on Oct. 16th.

Major Sever recommended adding 128,000 horsepower to the present resources within the next three years. His project calls for the expenditure of $20,000,000 to be divided between the War Finances Corporation, the Sims bill appropriation of $200,000,000 and the electric power corporations of California. The following items are contained in Major Sever's recommendations:

Addition of 36,000 kilowatts to the Sierra and San Francisco Power Company's system on the Stanislaus River.

Increased storage to develop 25,000 additional kilowatts on the Pacific Gas and Electric Company's system.

Development at Lake Almanor and on the Feather River to increase the Great Western Power Company's supply by fifty per cent, or 40,000 kilowatts.

Development of 50,000 kilowatts annually for three years at Sheep Rocks on the Pit River.

The construction of a 300,000 volt power line from the Rogue River in Oregon to supply the city of San Francisco. The heaviest power line now carries but 110,000 volts.

Further meetings of the League have been postponed until approved by the Board of Health.

California Association of Electrical Contractors and Dealers

At a meeting of the California Association of Electrical Contractors and Dealers, officers for the coming year were elected. In accordance with regulations of the national association these officers will not take office until Jan. 1st, 1919. They are:

M. A. Le Lew, President.
San Francisco Section—T. J. Bennett, C. L. Chamblin.
Oakland—R. V. Oyler, W. Mitick.
Stockton—C. E. Condit.
Sacramento—James Woods.
Sierra—J. M. Nightingale.
Central San Joaquin—H. H. Courtright.
Los Angeles—G. E. Arbogast.
Monterey Bay—W. E. Cox.
San Jose—F. J. Somers.

The remainder of the meeting was taken up with a discussion of priorities and the use of metals. The next meeting will probably be held in Sacramento or some other of the interior cities.

NOTES FROM THE PORTLAND CONTRACTORS AND DEALERS ASSOCIATION

The Monthly Meeting —

The regular semi-monthly meeting of the Portland branch of the Oregon Association of Electrical Contractors and Dealers was held in the dining room of the Seward Hotel Annex Monday evening, Oct. 7, 1918, at 7:30 p.m. After enjoying a dinner the regular meeting was called to order by J. H. Sroufe, chairman, twelve contracting firms being represented.

The following business was transacted:

F. D. Weber, chief electrical engineer of the Oregon Insurance Rating Bureau, was elected an honorary member of the association.

The application of R. C. Kingery, 254 Fourth street, Portland, was received and he was unanimously elected to a Class B membership.

The Price Book Data committee rendered a report and distributed the following price sheets for the Price Book:

Switch Boxes for Loom, Federal Bushings, Batteries—Dry and Wet, Crowsfoot, Bells, BX or Armored Conductors, BX Fittings, 4-inch Outlet Boxes, 4-inch Conduit Box Covers, 3⅝-inch Outlet Boxes, 3¼-inch Box Covers, 4-inch Square Outlet Boxes, 4-inch Square Box Covers. Proof was also corrected on three more sheets.

The secretary rendered a financial report showing the receipt of $209.08 for the month of September.

There was a general discussion by the members of the scarcity and uncertainty of obtaining both material and labor.

The following committee was appointed by the chairman to investigate the possibility of broadening the scope of the Electrical Inspection Department, City of Portland:

J. H. Sroufe, A. A. Tobey, F. A. Bauman, E. W. Price.

Also a Press Committee was appointed:

F. D. Weber, J. R. Tomlinson, R. C. Kenny, Ed. W. Pierce.

The matter of supporting the local organization was discussed. In the past the method has been to assess each member 1% of all contracts over and above $50. The suggestion that each member be rated on a definite amount per month for dues, or a certain per cent of the pay-roll or gross sales, was discussed at some length, the conclusion reached being that the past methods were not fair and equitable. The matter was referred to the Welfare Committee for investigation and their recommendation.

F. C. Green reported on the proposed building of 2000 homes in Portland to house war workers and suggested that the association put forth every effort to cooperate with this effort. In order to be of all assistance possible a committee was appointed to handle this matter with full power to act:

F. C. Green, R. W. Larson, E. W. Pierce, C. P. Scott, F. A. Bauman, J. R. Tomlinson.

The question of the association subscribing to both the National Contractor-Dealer and The Journal of Electricity for every member of the association was discussed and referred to the Finance Committee for a report at the next meeting.

The meeting thereupon adjourned.

Portland Notes —

Sam C. Jaggar of the Morrison Electric Company, Portland, is attending the meeting of the National Executive Committee at Toronto, Canada, from Oct. 14-16. Mr. Jaegar is National Chairman of the Architects Committee.

Jaggar-Sroufe Company have obtained the contract for the electrical equipment of five new concrete ships being constructed by the Great Northern Concrete Shipbuilding Company, Vancouver, Wash.

F. C. Bauman Company has the contract for the electrical equipment of the new Kerr-Gifford cereal and flour mill, Portland.

Pierce-Tomlinson Electric Company is installing the electrical equipment for the Viking Marine Paint Company, Portland, Oregon.

The Beaver Electric Company is installing the electrical equipments in the following plants in Portland: McDowel &

Overmigher, consisting of 200 h.p. in small motors; Michaeli Mill, Kenton, overhauling electric system and installing new work for a new airplane division; Neustader Factory No. 2, installing a new illuminating system, using C-2 lamps.

The Morrison Electric Company has just completed the installation of 30 electric ranges in the new apartment house, Silver Court.

JAPAN ENGINEERS' ASSOCIATION

A recent editorial in a Japanese technical paper points out that the extension of engineers' activities from purely technical to social, financial, and executive services has been a growing sentiment among thinking engineers. The social position of engineers has been far from ideal, perhaps, farther from that in Europe and America. The prejudice against engineers has been proverbial and has proved a stumbling block to the advancement of industry and technology in Japan. A new organization termed "Kosei-Kwai" (Engineeringpolitics Society) has recently been organized which declares as its purpose to improve the present state of industrial organization and administration, to promote technical education, to investigate and discuss important national questions so as to lead the public opinion and to move the national government.

A LETTER FROM THE FRONT

Armiger F. Dredge, the son of **Theo. F. Dredge,** western representative of the Pittsburgh Piping & Equipment Company, writes home of his experiences in electrical work with the forces in France:

On Active Service, A. E. F.
France.
Aug. 21, 1918.

My dear father:

I have charge of the field construction work on a pumping plant on a new water system. The job comprised installing and connecting, including foundation work of five centrifugal pumps, bell connected to five motors. Transformer station, switchboards and electrical control apparatus. Also about three-quarters of a mile of three phase 11,000 volt transmission line, lightning arresters, horn gaps and disconnecting switches and high tension fuses,—taken all in all, quite a lay-out.

The job is done now and another 24 hours will see the completion of its 240 hour continuous test run, after which it will be put in regular service. It has been interesting in the extreme, but it was beset with numerous difficulties of all sorts. In the beginning most of my labor was unskilled—negroes and guard house prisoners and you know what that means. Then, of course, under existing circumstances you cannot always get just what you want, either in the way of materials, fittings or tools—and you must adapt yourself and the job in hand to the stuff that is available. It is an interesting pastime devising ways and means of fitting together and piecing together into a workable whole a bunch of French and American machinery and fittings. But the job is done and running really better than could be expected, and I think all hands are satisfied.

There is an unbelievable amount of work to be done and done fast, as you may have learned from some articles I have recently seen in American magazines dealing with the work of the S. O. S. One of them gave a very accurate description of the work completed and under way at this port, of course giving no details or names.

This little plant that I have been working on seems to receive quite a bit of attention. We were highly honored not very long ago by a visit of inspection from General Pershing and his staff, as well as some French and British generals. Then a few days ago we received a similar visit from President Poincare, the Minister of Marine and beacoup Admirals, Generals, etc. This little village—for that is all it is—seems to be getting on the map.

ARMIGER F. DREDGE.

INFLUENZA FATALITIES

Jonathan Camp, president and general manager of the Franklin Electric Manufacturing Company, manufacturers of the Franklin Mazda lamp, died at his home in Hartford, Conn., on October 13th, a victim of the Spanish influenza epidemic. Mr. Camp began his business career in the hardware field in Hartford, Conn., but later became interested in the electrical industry through the Perkins Electric Switch Company of Bridgeport, with which he was connected. A few years ago Mr. Camp and the late Mr. C. I. Hills purchased the lamp manufacturing business of the Perkins Company and formed the Franklin Electric Manufacturing Company, Mr. Hills acting as president and Mr. Camp as treasurer and general manager. After Mr. Hills' death Mr. Camp became president and held this office until his death.

A. F. Wells, manager of the Wells-Morris Manufacturing Company and George H. Battee, of Bittman and Battee, both of San Francisco, are regretfully reported among the influenza victims. Both are well known in electrical circles in the West and their loss is deeply felt.

O. B. Penrose and J. M. Chamberlin of the Portland office of the Fobes Supply Company both have died as a result of the influenza epidemic. Their loss is deeply felt by the many who knew them on the Pacific coast.

HAPPENINGS IN THE INDUSTRY

MANUFACTURE OF CERTAIN ELECTRIC HEATING APPARATUS DISCONTINUED

The conservation division of the War Industries Board, applying to its program of eliminations to conserve essential materials and labor to free capital tied up unnecessarily in manufacturers' and merchants' stocks and to simplify factory production, has issued a schedule for manufacturers of electrical heating appliances which calls for discontinuance of the manufacture of the following electrical utensils and appliances:

Carburetors, heaters, hand-wheel heaters, intake heaters, manifold heaters, primer heaters, blankets, robes, cigar lighters, frying pans, plate warmers, curling irons, saute pans, waffle irons, fluting irons, egg boilers, soup kettles, stew pans, corn poppers, hand dryers, hosiery forms, peanut roasters, transfer irons, vaporizers, varnish sprayers, entree dishes, cigar lighters for automobile, bookbinding appliances, instantaneous water heaters, automobile foot warmers, fudge warmers, vegetable dishes, and all Sheffield plated ware.

The schedule for domestic appliances (660 watts or less, except ranges) provides that all appliances that are to be eliminated, but which are now in the process of manufacture or are completed and in stock, may be sold, but no more material for any of these appliances to be purchased except to balance up stocks on hand, and their manufacture is to be discontinued entirely December 31, 1918.

None to Add to Styles —

In no case is any manufacturer to add to the number of styles and sizes that he is now making. Each manufacturer of the following appliances to restrict his output to the number of styles and sizes specified:

	No. of styles.	Total No. of sizes.
Chafing dishes	3	1
Percolators with faucets	3	2
Percolators without faucets	3	2
Samovars	1	1
Nursery water heaters	1	2
Teapots	1	1
Hot water kettles	1	1
Ovens	1	1
Reflector heaters	2	2
Toasters	2	1
Toaster stoves	1	1
Convector heaters	1	1
Disk stoves	2	2
Fireless cookers	1	2
Flatirons, 7½ lbs. or less	2	2
Heating pads	2	2
Hair dryers	2	1

1 in each style.

Ranges: Not more than six different ranges covering both styles and sizes made at any one factory, and none to be made at any factory that is not producing ranges at this date. Nickel plating and fancy ornamentation to be eliminated.

Output to be Restricted —

Industrial appliances (over 660 watts): Each manufacturer of the following appliances to restrict his output to the number of styles and sizes specified:

	No. of styles.	Total No. of sizes.
Convention air heaters	3	7
Confectioners' appliances	2	2
Corset irons	1	1
Matrix dryers	1	1
Tailors' irons, 12 lbs. or over	2	4
Laundry irons, 7½ to 10 lbs.	1	2
Gluepots (no aluminum pots to be made)	1	3
Circulation water heaters	2	11
Immersion water heaters	1	8
Round disk hot plates, open-coil type	1	4
Round disk hot plates, solid top	1	3

Steam boilers: To be sold only where the electrical energy is generated from water power and there is a surplus of such energy available.

Restaurant equipment: Each manufacturer of the following appliances to restrict his output to the number of styles and sizes specified:

	No. of styles.	Total No. of sizes.
Bake ovens	1	5
Broilers	2	3
Grids	2	3
Toasters	2	2
Hotel ranges	1	2

In the appliances not discontinued, the Conservation Division has cut out 691 different styles and sizes. For instance, in chafing dishes, there were 36 styles and but 3 will be allowed; of electric teapots, 20 styles and 1 allowed; of toasters, 10 styles and but 2 allowed. Manufacturers are to discontinue silver plated and copper finished appliances from the styles and sizes they will continue to make.

BRITISH SHORTAGE OF COAL

It is Great Britain's turn this year to look forward to a coal shortage. It is not coming upon the country so suddenly as did our coal famine last year, but it is in sight and is being prepared for both by a comprehensive rationing scheme and by speeding up the output of coal. The British Coal Controller calculates that the shortage the coming year will run to 36,000,000 tons. The rationing plan includes not only coal but all fuel and power supplies that eventually rest on coal—electricity, gas, coke, and so on.

The dwelling-house rationing scheme is already in effect, and every householder will get restricted supplies of coal, electricity and gas proportionate to the size of his residence and the proportions of his family. This is calculated to save 9,000,000 tons; the other 27,000,000 tons, the Coal Controller is determined, will have to be saved by rationing the railroads and industries, and this rationing scheme will necessarily fall heaviest on luxury and non-essential industries. The general plan is to reduce coal supplies by one-half in those factories not engaged upon essential work, with a progressively smaller production in those factories which are manufacturing government supplies to a greater or lesser extent of their capacity.

EXPORTS TO RUSSIA PERMITTED

War Trade Board advise applications will now be considered for the exportation of all commodities to Russia. Exporters are requested to file their applications with the Bureau of Exports, War Trade Board, Washington, D. C. A limited amount of cargo space may be available for shipments from Pacific Coast direct to Vladivostok and in allocating space preference will be given to material covered by licenses issued on and after October 7, 1918. Each application should state whether or not material is made up and ready for shipment, and if so, the location thereof.

TRADE MARKS IN THE PHILIPPINES

Merchants are advised of the great importance of registering and protecting American trade marks in the Philippines. The Foreign Trade Department is advised that almost every new article introduced into the Philippines, with success, by American manufacturers is quickly imitated in shape, color and design and other ways likely to deceive unless the trade mark is registered.

ELECTRIC VEHICLES NOT BARRED ON SUNDAYS

In connection with the request of the U. S. Fuel Administration that gasoline cars be not run on Sundays, except in cases of necessity, C. C. Winningham, Fuel Administrator of the Gasoline Department, Washington, D. C., has stated that there is no objection to the operation of electric cars on Sundays. The request applies only to gasoline and kerosene propelled automobiles.

CONSERVATION MEASURES

Scarcity of Heater Cord —

A circular letter sent to central stations and dealers by the Edison Electric Appliance Company, Inc., points out that the heater cord situation is very serious at this time inasmuch as the manufacturers of this cord have been called upon to utilize their machinery, to a large extent, for war purposes. At the present time there is great difficulty in getting cord in sufficient quantities to supply the demand. The suggestion is made that every effort be put forth to conserve heater cord wherever possible. This could be accomplished by suggesting to customers, who want to purchase new cords for their appliances, to have their old cord repaired is possible, and if the customer is buying two appliances where the cords and plugs are interchangeable, suggesting to them that they use one cord and plug for both appliances, and the dealer can use the extra cord and plug for repair purposes. In view of these facts it has been necessary to limit the distribution of cords complete to six to any one customer.

NEW RADIO STATIONS IN JAPAN

A new radio-station for the Imperial Japanese Navy will be constructed near the coast of Sasebo with the expenditure of about $600,000. The main feature of the new station is that the entire system and apparatus are exclusively Japanese. The new station when completed is expected to contribute much to the defense of the country.

Another new radio station will be constructed somewhere in the prefecture of Fukushima. The new station is for the Department of Communications and is to be used for general service. The cost allotted is $390,000, and two years will be necessary for its completion. Engineers are now searching for the best location in the prefecture, and when the selection is made the construction will be started at once. When the station is completed it will be the finest one in the East.

SENATE CONSTITUTIONAL AMENDMENT NO. 30
(No. 23 on the Ballot)

The California Industrial Accident Commission sends out the following statement:

In 1911 a constitutional amendment was adopted which it was then thought was broad enough to give the Legislature all the power necessary for the enactment of a Workmen's Compensation, Insurance and Safety Act and the Legislature, acting under the authority of this amendment, did incorporate in one enactment a full plan of compensation, insurance and safety, with adequate provision for administration. This act has, with some modifications and amendments, been in operation for nearly five years and has given satisfaction to both employers and their employes and to the public generally.

But there are still some doubts entertained in certain quarters as to the constitutionality of some of the things that have been incorporated in this act, and it was for the purpose

of validating what the Legislature has done, and making the constitution broad enough to sanction the compensation law and the State Compensation Insurance Fund as they now exist, and so put their powers and obligations beyond the realm of controversy, that this proposed amendment was submitted. The people of California are respectfully asked to dispel all uncertainty as to the future by the adoption of Senate Constitutional Amendment No. 30 (23 on the ballot.)

FIRST ELECTRIC TRAIN OVER CASCADE MOUNTAINS

The completion of the western circuit of the Chicago, Milwaukee and Puget Sound Railroad was marked by the passage of the first electrically operated train over the Cascade Mountains. This completes the 850-mile run from Harlowton, Montana, 211 miles of which is over the Cascades, a record achievement in railway electrification.

TRADE NOTES

Change of Name —

The Oregon Power Company, operating in a score of cities in western Oregon with headquarters at Albany, Dallas, Springfield and Marshfield, will hereafter be known as the Mountain States Power Company. The Oregon Power Company has always been a part or a subsidiary of the Mountain States Power Company, formerly the Northern Idaho & Montana Power Company, and the change in name effective October 1st is merely to facilitate work in the various offices of the company.

A Company Dance —

The Hurley Machine Company of 28 East Jackson Boulevard, Chicago, recently gave a dance for its employes in the hall of the new factory. This hall has been provided for just such occasions and the dances are to be given every two weeks. At this first gathering which was in the nature of a housewarming, over 400 people were present. This included both men and women from the shop and the office employes. As can be judged from the accompanying sample of the little red, white and blue dance cards, the celebration was attractive in its detail as well as entertaining and was thoroughly enjoyed by all.

First Grand Reception and Ball

Hurley Hall

Saturday Evening, October 12th, 1918

Dance Program

Removal of Office —

Baker-Joslyn Company announces the removal of its San Francisco office and warehouse to 183-199 First street, corner of Howard. The new quarters are much more commodious and convenient and with their opening the company is enabled to give still better service to the trade. All interested are cordially invited to visit and inspect the new place of business. The telephone number has been changed to Sutter 2001. There is no change of address of the Seattle or Los Angeles branches.

Restriction of Iron Output —

Because the Government desires that every ounce of metal and every moment of man-power possible be devoted to the manufacture of strictly war supplies, the production of American Beauty electric irons and other electric heating devices for household use has been very materially reduced. This means, of course, that a great many people who wish to purchase these irons and devices must be temporarily disappointed, but the manufacturers believe that if the dealer who cannot supply his customers needs will explain to those customers the reasons for the shortage most of them will gladly comply with the Government's wishes and defer purchasing an electric flatiron or other electric heating device for household use until such time as they are again available. A large part of the manufacturing facilities of the American Electrical Heater Company of Detroit—the manufacturers of American Beauty electric heating devices—is being devoted to the manufacture of electric soldering irons, glue pots, air heaters, stoves and other electric heating devices for industrial use, either directly or indirectly, for the Government use in building, equipping, maintaining and keeping in repair aeroplanes, ships, munitions, submarines, guns, motors, gas masks, trucks, food containers, telegraph and telephone lines and equipment, radio apparatus and other war supplies.

Selling the War Service Idea —

The idea of cooperation in advertising brought out at the recent Los Angeles gathering of the California Electrical Cooperative Campaign is being carried one step further by the General Electric Division of the Edison Electric Appliance Company, Inc. In early issues of the Sunset Magazine three color advertisements will appear setting forth the war service uses of electric appliances. This campaign, opening up as it does a new field of appeal to the popular demand for electric appliances, may well be noted by the contractor-dealer and an effort be made on his part to tie-in with its activities.

New Company —

The Florence Mill Power & Light Company is to be incorporated at Florence, Ore. The executive committee consists of G. G. Bushman, Ernest Walker, Dr. Edwards, J. W. Bergman and Ed. Rackleff, selected to look after the business until the company is incorporated. Capital stock, $30,000.

New Plant —

The Air Reduction Sales Company, with temporary offices at 524 First avenue South, Seattle, will shortly be manufacturing its products in its new plant at 3623 East Marginal Way near Spokane street, according to Harold G. Stern, district manager of the company. About thirty persons will be employed in the manufacture of oxygen, acetylene, nitrogen and hydrogen. The Seattle branch is a part of a $12,000,000 corporation of New York, having 30 plants throughout the country, and is building 13 others. Oregon, Washington and a part of Montana will be supplied from the Seattle plant.

Company Sold —

Word comes from Morton, Washington, that the Lewis County Light & Telephone Company will be sold to satisfy a mortgage.

A New Pump —

The city of Seattle has purchased from the Allis-Chalmers Manufacturing Company a 200 horsepower motor for the West Seattle pumping station to be direct-connected to a centrifugal pump. This was necessitated by the rapid growth of West Seattle and it was necessary to provide water for the homes of those employed in the shipyards.

Enlarged Plant —

The Hallidie Company of Spokane is erecting a large addition to its plant at North 702 Division street and is also building an addition to its boiler house and putting in a new 150 h.p. boiler. Its first $80,000 turbine wheel for the emergency fleet has been completed and will be shipped to Seattle for a new 8800 ton freighter being built for the government.

New Business —

Thompson & Castleton, 316 First avenue South, Seattle, have been awarded a contract for furnishing and installing the motors in the foundry of the Northwest Motor Company at South Park. Motors will be required to the extent of 200 horsepower, ranging all the way from 10 to 100 horsepower. The foundry will cost approximately $150,000. The company has just been awarded the contract for overhauling and drying out all the electrical and steam machinery of the Rainier Heat, Light & Power Company which was submerged through the breaking of a water main.

ELECTRIC LIGHTING PLANTS WITH OUR TROOPS

(Following the request of President Wilson onSeptember 5th, the seven accredited civilian agencies working for soldiers, sailors and marines have joined forces for the United War Work Campaign to be held November 11-18. The goal is $170,500,000. The hugeness of the sum needed and the short interim between the date of the President's decision and the opening of the campaign necessitates the widest cooperation if the public is to be made aware of the tremendous import of this drive. What would war be yet were it not for this help? Do your share.—The Editor.)

A factor of no small importance in carrying on the work of the various welfare bodies among American troops at home as well as in the trenches, is adequate lighting.

Even in the trenches the importance of light as a factor in maintaining the morale of the men is recognized and the army has a special organization whose principal duty is to extend electrical distribution systems as far in the zone of advance as possible.

Long ago the French recognized the influence of light. Last winter Captain Gustave P. Capart, of General Petain's staff, when in this country said, "Electric lighting of a general nature is the thing which, next to nourishment, contributes the most to maintain the morale of the men."

Where current is not available from central stations in France, an American plant of the "farm-lighting" type is installed. This is a Y. M. C. A. hut near the front lines. Note the electric lights. The picture is copyrighted by the Committee on Public Information.

A "Y" woman who has just returned to this country after a tour of duty close to the advancing armies tells further of the seeming incongruity of modern lighting in places where humanity has returned almost to the primitive.

"It came as a bit of shock," she said, "when a soldier came to our hut from one of the underground telephone exchanges to see if we had an extra bulb. A shell explosion had shattered the filament of their last bulb, and the switchboard operators in the dugout were getting along as best they could with the light from candles stuck in the necks of bottles. We couldn't help him, for lights above ground are taboo in that section, and we had no bulbs. I don't know how long they had to get along without electric light, or where they finally found a new bulb, for there is no lighting company in that region with a service department ready to respond to the anxious demands of customers."

In the cantonments in this country there need be little concern on the part of welfare organizations as to lighting problems. Every camp has its own lighting system, usually supplied from the nearest town, and current is always available for the recreation huts, for the libraries, for the hostess houses and for the motion picture machines.

But a great part of the work of these bodies is away from the camps with their organized comforts, and the workers must provide their own electrical equipment. On the Mexican border the Y. M. C. A. has a portable motion picture outfit mounted on a motor truck, which makes a circuit every month and takes the latest films to army posts. The truck is equipped with special compartments for carrying film, with screen supports, projecting apparatus and an electric generator connected with the truck's engine which provides the current. Similar equipment is used in France. For instance, in the last fourteen months the Y. M. C. A. sent 585 motion picture machines and 245 stereopticon machines to France, while seventy-one Delco lighting plants have been set up.

Exterior of a Y. M. C. A. canteen dug-out situated 150 yards from the Boche line. The picture is copyrighted by the Committee on Public Information.

These items are but a small part of the millions of dollars worth of equipment required to carry on the welfare work among American soldiers at home and abroad. It is estimated that nearly $200,000,000 will be required next year, and to raise this sum the various organizations have incorporated the United War Work Campaign which is to make the appeal on behalf of the Young Men's Christian Association, the Young Women's Christian Association, the National Catholic War Council and Knights of Columbus, the War Camp Community Service, the Jewish Welfare Board, the American Library Association, and the Salvation Army.

Y. M. C. A. women operating a motion picture machine for the amusement of soldiers who visit the Y. M. C. A. canteen, Somewhere in France. You are to be asked during the week commencing November 11th to help make possible these essential agencies for the brightening of life for "the boys." Be ready. The picture is copyrighted by the Committee on Public Information.

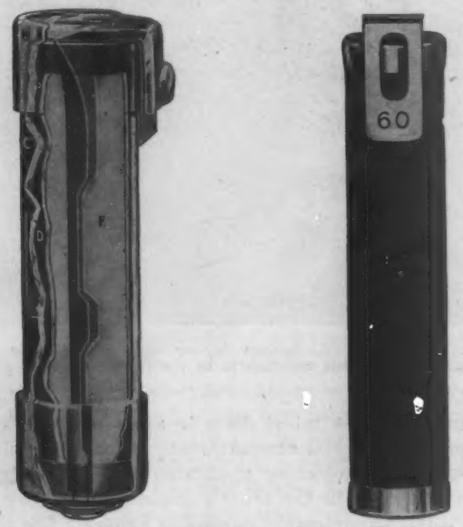
LATEST IN EVERYTHING ELECTRICAL

(A renewable fuse with a refill cartridge which makes possible a considerable saving in that the outer casing is used again and again, mazda lamps as applied to industrial lighting and a switch which does away with all possibility of accident, having no live parts accessible either on the ordinary operation of the switch or when replacing fuses.—The Editor.)

NATIONAL RENEWABLE FUSE

The National Renewable Fuse in appearance closely resembles the old type standard fuse; in function, it is exactly the same.

However, when a blow-out is caused, instead of throwing away the entire fuse and inserting a new one, you simply discard the re-fill cartridge and insert a new one. The brass terminals and the heavy fibre casing which represent the burden of expense in the manufacture of the fuse, are just as good after a blow-out as before.



An exploded view of the fuse and the refill cartridge

There are only three parts to the National Renewable Fuse—the outer casing, the inner cartridge or shell, and the detachable cap.

The brass terminals are built on to the fibre casing so there is no possibility of their working loose. To remove a blown-out cartridge, it is simply necessary to loosen two screws, one at the bottom of one terminal, and one on the side of the other. The cap is then lifted off and the filler

Figure 1 illustrates the first step necessary to withdraw the blown cartridge. The screw in the top of the fuse proper is loosened and the cap drops off.

dropped out, a new one inserted, the screws tightened and the fuse is as complete as when originally built. It is impossible to completely withdraw the screws from either terminal, eliminating the possibility of their becoming mislaid. In addition, the exact rating of the element itself is plainly visible at all times—being stamped deeply into the metal tongue indicator of the element—and the tongue is automatically locked in full view when in use.

The following excerpt is taken from a letter received by the Federal Sign System (Electric) from the Factory Mutual Laboratories:

"In view of the satisfactory tests which we have made of your 'National' Fuse and the fact that we believe this fuse complies with all the requirements of the specifications in our Electric Rules, we are planning to include the name of your company in our next edition of Approved Electrical Fittings List."

This letter means that the National Fuse will be permitted in all factories whose insurance is placed with the Associated Factory Mutual Fire Insurance Companies, and further means

Figure 2 shows the loosening of the end screw. This screw projects into the bottom of the cartridge, holding it firmly and making an absolutely perfect contact. When this screw has been loosened, the blown cartridge is ready for removal.

Figure 3 illustrates how simply and easily the cartridge is removed from the outer casing. With the bottom screw loosened and the cap off, the cartridge itself simply drops out. The holder is now ready for the new cartridge. Simply reverse the order of the illustrations and the operation is complete.

that it will be so shown in the next edition of Approved Electrical Fittings issued by the Factory Mutuals. The Factory Mutual Laboratories have decided that the National Fuse qualifies as a standard fuse with a renewable feature and it will be so listed.

CORRECT LIGHTING IN LARGE SHOPS

The Edison Lamp Workers of the General Electric Company have made an intensive study of the problem of general lighting in large shops. By correctly placing Edison Mazda lamps in their various sizes with suitable reflectors, it is now possible to illuminate a factory so that night work may be carried on with practically as high a degree of efficiency as is maintained during the daylight period. When lighting conditions are correctly adjusted, the strain on the workers' eyesight is very little greater than it is under natural lighting conditions. Moreover, the danger of accident to the worker, and of spoilage to the goods handled, is minimized by correct lighting. The cheerful, well-lighted room has a psychological effect, too, towards speeding up production, so that the additional cost of installing a scientific lighting system is more than offset by the increased returns.

As the arrangement of machinery varies considerably in different plants, it is impossible to specify any scheme which would be universally satisfactory. But the Edison Lamp Works have developed a flexible service that can accommodate all the varied conditions to be met by illuminants.

Besides the regulation Mazda B lamps employed for the smaller sizes, Mazda C, with the drawn wire filament curled into a continuous helix or spiral of smaller diameter, in a bulb containing nitrogen gas, and Mazda C-2, with the regular Mazda C light filtered to approximate daylight color, are popular when larger sizes are needed.

The reflector is a very important item in all lighting systems. It is necessary to diffuse the light rays, in order to

A night view in the mangle room of a steam laundry. 100-watt bowl frosted Edison Mazda C lamps in enamel steel dome-shaped reflectors are used. The localized general scheme of placing outlets is used here so that the lamps are in a correct relative position to the table and shadows are avoided. In the ironing room the lamps should not be more than four feet above each board, and for the folding and inspection benches, Mazda C-2 lamps are especially desirable. If the light source is rich in yellow, the brownish or yellowish stains fade into the background and are hard to detect. With properly adjusted lights, the inspector can catch many an improperly cleaned piece.

protect the eyes from direct light, and to send the light in certain directions to the points where it is most needed.

The plan of general illumination is now practically standard because it enables the whole room to be lighted uniformly with larger lamps, which have proved to be more efficient and more economical than the smaller drop lights. The units being held well above the reach of the worker eliminates handling and resultant breakage. The indirect method of supplying general illumination is becoming more popular than the direct method, although it is less economical. A combination of the direct and the indirect system, in which some of the light is reflected from the ceiling and some is diffused through the translucent bowl, is probably the most efficient and it is much better for the eyes than is the direct lighting system.

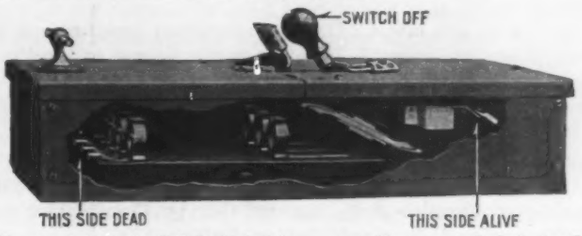
Detailed suggestions for lighting can only be made with a knowledge of the specific factory to be lighted. The accompanying illustration shows the solution of one laundry's lighting problem with Mazda lamps. Different conditions of lighting are desirable for hand sewing, for fitting, for packing and shipping, for sample displaying. The General Electric Company has developed a lighting plan to meet the requirements of each of these operations.

A SAFETY SWITCH

In many steel mills, factories, mines, and similar industries where most of the workmen have little knowledge of electricity, it is desirable to use switches having no live parts exposed or accessible in the ordinary operation of the switches or when replacing fuses.

This is fully accomplished in the Krantz Auto-Lock Switch, marketed by the Westinghouse Electric & Manufacturing Company, which is intended for use on main circuits or wherever an ordinary knife switch is applied. The switching parts and fuses are enclosed in a steel box, the cover of which is in two parts, one being screwed on to form a permanent covering for that end of the box containing the switch, and the other part being hinged so as to swing back and permit the renewal of fuses, which are located in this portion of the box. An ingenious latching mechanism makes it impossible to open the cover without first throwing the switch to the "off" position and rendering all fuses and other accessible parts dead. Thus fuses may be replaced at any time with absolute safety. As long as the door of the case is open, the switch contacts cannot be closed.

By using a padlock, the switch handle can be locked in the "off" position, making it impossible for any one to close the switch, except the person holding the key to the padlock. By using another padlock, the cover may be locked shut, so that the fuses cannot be tampered with.



Krantz Auto-Lock Switch, locked in open position, cover locked closed

Contact is made by means of a laminated spring copper brush, double ended with auxiliary arcing contacts at each end. The outer leaves of the brush are bronze to provide additional spring pressure.

The stationary contacts are of hand-drawn copper and are mounted on slate bases, one of which in the fused switch carries one of the fuse clips, while the other forms the terminal block for the incoming line and is mounted under the stationary portion of the cover.

The operating mechanism is galvanized steel of the toggle type, and is attached to the under side of the stationary end of the cover. This mechanism can be easily removed for inspection by removing several screws.

In closing the pressure between the contacts causes the laminations of the brush to spread apart, giving it a wiping or self-cleaning action.

The double-ended brushes provide a double break, dividing the arc between the two ends, each of which is provided with a separate arcing tip.

In the closed position the switch is held in positive contact by throwing a toggle over center. A spring provides a quick-break for opening, the mechanism being independent of the operating handle.

These switches are supplied for 250, 500 and 600 volt, for either alternating or direct-current service, and in capacities up to 2000 amperes.

The safety features of this switch have been recognized by the American Museum of Safety which has awarded it a gold medal and special mention.

BOOKS AND BULLETINS

Government Publications

The Bureau of Standards publication on "The Photo-electric Sensitivity of Bismuthinite and Various Other Substances" is now ready for distribution. A request addressed to the Bureau of Standards, Washington, D. C., and asking for Scientific paper 322, will bring the publication to you.

A Government reprint has been made of the "Saturday Evening Post" article by Edward N. Hurley, Chairman of the United States Shipping Board, entitled "Why Our Ships Will Now Stay on the Ocean." It is an intensely interesting, popular review of the naval situation.

The American National Red Cross bulletin of March, 1918, records appropriations from the war fund by the War Council, from its appointment by President Wilson, May 10, 1917.

Another Government war publication is Bulletin No. 5 of the Tariff Information Series. Its subject is "The Glass Industry as Affected by the war." It discusses new branches of the industry—changes in manufacture and trade due to war conditions—holding export and domestic trade after the war—the glass trade of European countries, and concludes with the testimony of leading American manufacturers.

An address on the labor problem delivered by the Hon. W. B. Wilson, Secretary of Labor, at a luncheon given by Grosvenor B. Clarkson, Secretary of the Council of Defense, has been printed in a small booklet by the Government Printing Office.

One of the latest of the Government publications appeared on September 3, 1918. It is the Report to the President by W. G. McAdoo, Director General of Railroads, on the work of the United States Railroad Administration for the first seven months of its existence, ending July 31, 1918.

Bureau of Mines Bulletins

W. P. Dykema has made an intensive study of the "Recovery of Gasoline from Natural Gas by Compression and Refrigeration." It is published as Bulletin 151.

Technical Paper 91 presents an illustrated report, by J. D. Davis and E. I. Wallace, on "A Convenient Multiple-Unit Calorimeter Installation."

A study on "Measuring the Temperature of Gases in Boiler Settings" by Henry Krusinger and J. F. Barkley is published in Bulletin 145.

Technical Paper 187 reproduces a report on "Slag Viscosity Tables for Blast-Furnace Work" by Alexander L. Feild and P. H. Royster.

"The Tars Distilled from Bituminous Coal in Hand-fired Furnaces," prepared by S. H. Katz, records results of tests made by the Bureau of Mines. It is published in Technical Paper 195.

Technical Paper 139 is the result of the most recent studies of the bureau's combustion expert. Its subject is "Low-Rate Combustion in Fuel Beds of Hand-fired Furnaces." It contains a great amount of information concerning the burning of coal in household furnaces.

A detailed report on the subject of Manganese ore in the United States is being prepared for publication by H. D. Miser, of the Geological Survey. It will appear soon in a Department of the Interior bulletin.

The Western Union and the War Labor Board

In a little booklet, "The Western Union and the War Labor Board," the telegraph company defines its position in the recent labor dispute. Because it has refused to retain in its employment workers belonging to striking organizations, the matter has been appealed to the War Labor Board for settlement. The Board urged that Western Union employes be permitted to join the Commercial Telegraphers' Union under certain conditions, but the company, believing that telegraph service, like postal service, should not be subject to interruption from outside agencies, is launching a new organization, for Western Union employes exclusively, which will have all the advantages of collective organization, but which will not be controlled by an outside power.

Trumbull Cheer

The "Trumbull Cheer" for September, published by the Trumbull Electric Manufacturing Company, has reached us and is as full of energy and of valuable information as usual. It is accompanied by a little booklet "Enclosed Switches Electrically Operated" which describes the "Circle T" appliances.

G-E Bulletins

Bulletin No. 44678 of the General Electric Company describes and lists Drum Type Controllers for Railway Service.

Bulletin 68411 of the General Electric Company describes in some detail a Pressure Governor for alternating or direct current circuits.

A bulletin on Drum Controllers for slip ring induction motors has just been gotten out by the General Electric Company.

Drum type controllers for series, shunt or compound wound motors are described and listed in a bulletin recently issued by the General Electric Company.

Electrical Blue Book

compiled by the Electrical Review, Chicago; size 9 x 12 inches; 274 pp.; published by the International Trade Press, Inc., Chicago, and for sale by the Technical Book Shop, San Francisco. Price $2.00.

This is the eighth edition of the Electrical Blue Book, which is in brief a directory of electrical appliances and material. The work roughly divides itself into three parts. A catalogue list of the manufacturers of various types of electrical apparatus, and descriptive and illustrated matter describing these articles fill the first 170 pages of the book. Where these come under the ruling of the Underwriters' Laboratory, their approval is indicated. A complete list of inspected electrical apparatus and material follows, forming together a valuable reference book for buyers and handlers of electrical apparatus. A special feature of the book is the full text of the National Electrical Code with revisions to date specially indicated, which is included in the back. Illustrations help to make directions and details clear. A list of members of the Electrical Supply Jobbers' Association and a directory of electrical associations add to the value of the book as a convenient reference.

The Diesel Engine—Its Fuels and Its Uses

by Herbert Haas, 6 x 9 inches, paper cover; 133 pp.; published by the Bureau of Mines, Department of the Interior and to be obtained by application to the "Superintendent of Documents, Government Printing Office, Washington, D. C." under the title of Bulletin 156, Petroleum Technology No. 44. Price 25 cents.

In view of the growing importance of the Diesel engine, particularly in the propulsion of ships, this comprehensive and authoritative study of its principles and use, together with the handling of its fuel under various circumstances, is one of particular value. It is generally recognized that the ship fuel of the future will be fuel oil and that if our merchant marine is to maintain its position after the war it will mean, to a large extent, that it is outfitted with Diesel engines for fuel oil burning. The bulletin here published covers the subject in a thorough and scientific way, considering the details of the engine and methods of its handling, the types made in the United States, liquid fuels and the elements to be considered in their use with Diesel engines, lubricating oils, advantages of the engine as a whole, comparative cost data and special applications of the type of engine to various land and water uses. A selected bibliography adds to the value of the book. Tables and illustrations are profuse and well executed. In short, the pamphlet is perhaps the most valuable work on this subject which is available at the present time.

NEW ELECTRICAL DEVELOPMENTS

(Considerable activity in the Northwest with plans for extending the municipal projects and continued agitation of street car wage and fare problems; several appeals to the Capital Issues Committee from the Pacific Central District and a possibility of government help on the Hetch Hetchy project; in the Southwest, Secretary Lane has failed to sign the agreement with the Imperial Valley, and demands for power for mining purposes and lighting extensions are reported from the Inter-Mountain District.—The Editor.)

THE PACIFIC NORTHWEST

COULEE CITY, WASH.—The local electric light plant was entirely destroyed by fire recently.

VANCOUVER, B. C.—The Tudhope Electric Metals Company is contemplating the construction of a new foundry, 50 ft. by 100 ft.

JUNEAU, ALASKA.—The Chicago Mining Company will erect a new power plant, putting in a new compressor, and increasing hoist capacity, etc.

COQUITLAM, B. C.—The Western Power Company is to take up at once the proposition of extending the lights on the Pitt river road to the shipyards.

SEATTLE, WASH.—The thirty street cars purchased by the Emergency Fleet Corporation for the Seattle municipal line have been shipped from St. Paul.

SEATTLE, WASH.—All bids received for furnishing the city with Westinghouse motors were rejected as being too high and not according to specifications.

NEW WESTMINISTER, B. C.—The Lumber Products, Brunette street, is considering building an addition to its plant and installing new machinery, at a cost of about $120,000.

EVERETT, WASH.—The Pacific Coast branch of the Fordson Tractor Company, it is announced, will be located in Everett. About 8000 people will be employed at the proposed plant.

GRANBY, B. C.—Preparations are being made for the installation of an electric lighting system in the new town of Granby, near Cassidy's Siding. An air shaft has been completed preparatory to installing a permanent air fan.

WALLA WALLA, WASH.—F. J. Pingry, manager of the Burbank irrigation project, will leave in a few days for Washington, D. C., to confer with the Secretary of the Interior concerning the development of Five-Mile rapids on the Snake river north of Pasco.

PORTLAND, ORE.—D. E. Skinner, president of the Skinner & Eddy Corporation of Seattle, has been in this city consulting with H. F. Gronen, city light commissioner, relative to rates on power for a $750,000 electric smelter which he is contemplating establishing in this city.

FERNDALE, WASH.—Ferndale is to have a 24-hour electric service within the next six months, the Puget Sound Traction, Light & Power Company having ordered the necessary supplies and planning to establish a substation at Laurel and run the lines from Ferndale from that point, provided permission is granted by the government to make the extensions.

SALEM, ORE.—Director Gilman has informed the Public Service Commission that the proposed physical connection of the Oregon Electric and Southern Pacific at Eugene is too expensive to make, considering the service it will perform, but he states that if the connections at Albany and Salem fail to keep the Oregon Electric cars loaded, the Eugene connection will be given further consideration.

OLYMPIA, WASH.—A hydro-electric plant and two electric smelting furnaces are being installed on a manganese mine in the Olympic mountains by the Olympic Smelters, H. H. Piper of Olympia, manager. The electrical equipment consists of two 300 kw. alternating current generators driven by impulse wheels, Pelton type, producing energy for two Greene electric furnaces. C. Kirk Hillman Company, Seattle, rebuilt and sold the generators to the company.

ASTORIA, ORE.—With the immediate needs of the Port of Astoria for electric power, the community as a whole is short fully 50 per cent of the requirements necessary. This was the statement disclosed at the meeting of the Port of Astoria. A hydroelectric engineer is to be employed to make the research for the city and it is contemplated that sufficient eelectric energy is to be employed in the lower Columbia river district to take care of a city with 200,000 population.

SALEM, ORE.—State Engineer Lewis has approved the general plans for the Enterprise irrigation district in Klamath county. The district is being developed in cooperation with the United States reclamation service, as it is proposed to pump water for the district from the reclamation service canal, which now serve the Klamath reclamation project. The district will install its own pump and laterals from the main canal.

SALEM, ORE.—In order to enable the California-Oregon Power Company to extend its electric power service in the city of Medford, the public service commission, through Commissioner Buchtel, has asked the Postal Telegraph-Cable Company to enter into a common user agreement in connection with its telegraph poles. The Postal company has refused to consider such an agreement, taking the position that as the telegraph lines are now under government control the state commission has no authority over them.

SEATTLE, WASH.—The actual cost of the street car operating property of the Puget Sound Traction, Light & Power Company in the city of Seattle and which the city has arranged to buy was $15,303,360, according to a report filed with the city council by Smith, Robertson & Moorehouse, public accountants engaged by the city to check the traction company's property. This represents the property which the city proposes to buy for $15,000,000. It is estimated that it would cost nearly twice that amount to reproduce the property.

SPOKANE, WASH.—No change will be made in the contracts between the Washington Water Power Company and the city of Spokane for electric current for general street lighting, ornamental curb lighting and power because of the recent decision of the Washington Public Service Commission advancing light and power rates in the downtown districts. The new schedule called for an increase of approximately $15,000 in street lighting costs over figures in the new ten-year contract made this year by the city with the power company.

SEATTLE, WASH.—According to a report made in the office of City Comptroller Harry W. Carroll, the net profit of the city lighting department for the first six months of 1918 was $268,530.84. The statement was prepared by Frank L. Mitten and George Liebes of the state bureau of supervision of public offices, and was in response to a resolution of the city council asking for a statement showing the income and expenditures of the lighting department for the six months ending June 30th, for the information of prospective purchasers of Skagit river bonds.

SEATTLE, WASH.—Preparations are being made to

submit the question of street car wages in Seattle to the War Labor Board. It had been hoped to avoid this step but the failure of the city and traction company to get together on the deal by which the city is to purchase the lines of the Puget Sound Traction, Light & Power Company has left this as the only course. The new wage agreement between the street car men's union and the traction company, fixing the scale at 50, 55 and 60 cents an hour was made contingent on the city's permitting the traction company to increase its earnings.

SEATTLE, WASH.—The city council has sold $1,500,000 of the Skagit power bonds to Carstens & Earles and John E. Price & Co. Other issues of the total of $5,000,000 Skagit power bonds will be sold as the money is required to build the plant. The bid accepted included the following three offered for the bonds: $1,501,500 for 6% bonds, $1,440,300 for 5½% bonds, $1,383,900 for 5% bonds. The sales of the $1,500,000 worth of bonds were authorized by the Capital Issues Committee on condition that they be disposed of to a single purchaser and not offered for sale to individuals until Oct. 20th, when the Liberty Bonds Campaign would have closed.

TACOMA, WASH.—The city council may take up soon the development of a storage basin for the city hydroelectric plant at La Grande, as a result of its inspection of the plant and the site for an impounding basin above it on the Nisqually river. The fact that the city's plant is pulling now its capacity load at peak hours, and will have additional heavy service to meet soon, brought a number of the councilmen to realize that the months intervening before the low water period of next year should be utilized to increase the capacity of the plant. If the city coucil decides to begin the storage development at once, permission to issue utility bonds to the amount necessary will be sought.

WALLA WALLA, WASH.—The Walla Walla Railway Company has asked the city council of Walla Walla for a change in its franchise obligation so that an 8-cent fare can be charged. The company also asks changes relative to paving expenses and franchise payments but lays special stress on the need of raising its fares, stating that it has now reached the point where the continuance of service is impossible unless all unnecessary burdens are eliminated and substantially increased revenues are obtained. The city commission has gone on record favoring the increased rate asked by the company.

VANCOUVER, WASH.—In the vote of the Vancouver, B. C., tax payers on the six-cent street car by-law which had been approved by the city council, the proposed increase of one cent in fares was defeated by 783 majority in a total of 2141. This leaves the situation more muddled than ever. On behalf of the company, it is officially announced that the company will continue to charge the six-cent fare on its city cars. On the part of the city, Mayor Gale, backed unanimously by the aldermen, announces that the only course open to the city, now that the electorate has turned down the by-law, is to press the legal battle for the injunction which the city has applied for to restrain the company from charging more than the five cents prevalent under the original franchise agreement.

LAKE PLEASANT, WASH.—Charles C. Moore & Company, engineers, Mutual Life Building, Seattle, are busily engaged in tearing down the mill and building of the British-Canadian Mills & Timber Company at New Westminster, B. C., same to be erected at Spruce Mill No. 2 of the U. S. Signal Corps, Toledo, Oregon, and partly at Mill No. 3, Lake Pleasant, Wash. These mills are to be electrically operated and they are installing a new power plant for Mill No. 2. The turbine at the British Columbia mill will be installed at Toledo and eight 250 h.p. Stirling boilers will be installed. In Mill No. 1 at Port Angeles, Wash., Stirling boilers of 2400 h.p. capacity will be installed and Stirling boilers of similar capacity at Mill No. 3 at Lake Pleasant. They are installing at Mills No. 1 and 3 brick chimneys and a steel stack at the Toledo, Ore., mill. Each of these mills is intended to cut 1,000,000 feet of spruce per day.

SEATTLE, WASH.—At a meeting of the city utilities committee it was decided to ask the corporation counsel to draw an ordinance providing for an additional issue of $1,750,000 utility bonds against the city for the approval of the capital issues committee. The bond issue, according to Chairman O. T. Erickson of the utilities committee, will take care of all construction and extension work in the city lighting department for the next three years, and will also enable the department to retire its outstanding warrant indebtedness, now amounting to between $800,000 and $900,000, out of the current revenues of the plant within the next eighteen months. The money to be derived from the sale of bonds will be devoted to the building of the Ballard substation, a new substation on the water front, and allow an amount estimated at $250,000 a year for extensions for the next three years. In addition the money will provide the $75,000 needed to cover the cost of the interconnection with the system of the Puget Sound Traction, Light & Power Company, as was demanded by the capital issues committee as a condition precedent to the approval of the first issue of $1,500,000 of the proposed $5,500,000 Skagit bond issue.

THE PACIFIC CENTRAL DISTRICT

COURTLAND, CAL.—The New Freeport Telephone & Telegraph Company has applied for dissolution.

INGOT, CAL.—Afterthought Copper Company has under consideration the construction of an electrolytic plant at its mines.

SACRAMENTO, CAL.—All bids received for the electrical pumping station for the city water works were rejected by the city council.

EUREKA, CAL.—The Railroad Commission of California has authorized an increase in electric light and power rates by the Western States Gas & Electric Company.

KESWICK, CAL.—Considerable new electrical equipment will be required in connection with the construction of the new 30-ton capacity mill at the Scottish Chief mine, near Keswick. M. A. Maher is superintendent.

EUREKA, CAL.—The Western States Gas & Electric Company will supply 80 kilowatts of electrical energy to the contractor who will raise the steamer Corona. This power will be required for about six months.

OLINDA, CAL.—The Capital Issues Commission has approved the Happy Valley irrigation district's application for permission to offer for sale $260,000 of 6 per cent bonds for building the first unit of its irrigation system.

SACRAMENTO, CAL.—Omer S. Avery has applied to the State Water Commission for 40 miner's inches of the waters of Heifer Creek, Glenn county, tributary to Stony Creek, for power purposes. The cost of proposed works is estimated at $10,000.

SACRAMENTO, CAL.—Twelve claims from the Pacific Gas & Electric Company and two from the Great Western Power Company, which have been held up for several weeks, were passed upon by the Finance Committee and upon the motion of Commissioner of Public Works Thomas Coulter, were ordered paid under protest.

SAN JOSE, CAL.—Sealed bids will be received by the Board of Supervisors up to Nov. 4th, for one 75 h.p., 900 r.p.m., General Electric Type K, 1918 model, 3 phase, 220 volt motor, with pulley, base oil and H-3 Compensator, with overload relay and no-voltage release.

ORLAND, CAL.—The National Pole Company has closed a lease for ten years on five acres adjoining the lease of the American Manganese Steel Company on the Parr-McCormick tract, for the purpose of establishing a factory for the manufacture of telephone and telegraph poles.

WILLOWS, CAL.—The Princeton-Codora-Glenn Irrigation District has applied to the State Water Commission for permission to install two pumping plants for the purpose of securing water direct from the river instead of through the West Side Canal. They claim there is a scarcity of water due to new areas being cultivated for rice.

RED BLUFF, CAL.—Steps toward cooperation with the United States Reclamation Service that final surveys be made of the great proposed Iron Canyon irrigation project were taken at the last meeting of the Sacramento Valley Development Association. Secretary Franklin K. Lane of the Department of the Interior has authorized a federal appropriation of $10,000 for the final survey of the dam site, provided California raises $20,000 toward the $30,000 fund.

SAN FRANCISCO, CAL.—Pacific Telephone & Telegrraph Company mailed a report of its income for the quarter ended September 30, 1918, to its stockholders, who deemed the showing made highly satisfactory. Gross earnings when compared with the return for the corresponding quarter of 1917 show a gain of $268,588, while net earnings increased $41,874 and the surplus available for dividends on the common stock and for other corporate purposes reflect a gain of $21,500.

BERKELEY, CAL. — Berkeley's advisory committee named to draft a resettlement franchise for the San Francisco-Oakland Terminal Railways has submitted a blanket franchise to the city council recommending that the proposal be placed before the electors of the city. The new franchise as submitted by the advisory board consolidates some 140 or more individual permits for operation into a single blanket franchise and places the city and the traction company as equal partners in operating the street car lines.

RIO VISTA, CAL.—The largest irrigation and reclamation project that has been launched in this section for many years has been organized recently. Headed by G. Khan, a prominent Hindu rancher of the Delta country, and a delegation of other wealthy Hindus, a company has been formed to reclaim the tract known as Maine Prairie, a tract of alkali desert five miles south of Dixon, for the development of a rice growing concern. It is proposed to install an immense pumping plant, containing a 325 h.p. pump, with twenty-inch intake and outlet.

SAN FRANCISCO, CAL.—Hetch Hetchy power development has been rated as a war necessity, according to a ruling made by Major George F. Sever, representing the power division of the War Industries Board. Men now employed on the project will be recommended for exemption. This, taken with the recent ruling made at Washington by the priorities committee giving the city the right to both material and labor for the work, has been taken at the City Hall to mean that it is probable that the government will assist San Francisco in the development of Hetch Hetchy power by assisting in the financing of Hetch Hetchy bonds.

OAKDALE, CAL.—The Oakdale Irrigation District has filed upon 150,000 acre feet of water in the Stanislaus river watershed, the filing being made with both the State Water Commission and the Department of the Interior. The district proposes to build a dam near Copperopolis, a few miles above Goodwin Dam, where the water is diverted into the district's canals at this time. If this plan is carried out and the plans of the Utica Gold Mining Company and the Sierra and San Francisco Power Company are also consummated, the waters of the Stanislaus will be utilized four different times for the manufacture of power, and then a fifth time for irrigation purposes.

THE PACIFIC SOUTHWEST

LAS VEGAS, N. M.—At a meeting of the city council water and light committee City Engineer V. K. Jones was named by the mayor to look into the matter of water supply, the city being short of water at this time.

PHOENIX, ARIZ.—The board of governors of the Water Users' Association has opened bids for the drilling and casing necessary for the installation of new pumping plants and awarded the contract to the lowest bidder.

LOMPOC, CAL.—The Santa Barbara Telephone Company having made application for a franchise to install and operate a telephone and telegraph line, sealed bids for such a franchise will be received up to November 6th.

SAN DIEGO, CAL.—In connection with the construction of the proposed new laundry at Camp Kearny to cost in the neighborhood of $150,000, plans have been prepared for the erection of a new power plant for its operation.

SAN DIEGO, CAL.—Plans have been completed by the San Diego & Arizona Railroad Company for the erection of new locomotive and car repair shops in the vicinity of Sixteenth Street and Newton Avenue. A new engine will also be built.

LA JOLLA, CAL.—At a meeting of the Chamber of Commerce action was taken that materially brightened the prospect of La Jolla securing electric trolley service to San Diego. A comprehensive report was given by Superintendent of Motor Power H. McNutt.

EL CENTRO, CAL.—Imperial Irrigation District officials and water users have received word that Secretary of Interior Franklin K. Lane is not to sign the contract between the district and the government that would provide for connection with the Laguna dam, as a means of assuring a permanent water supply for the valley.

THE INTER-MOUNTAIN DISTRICT

BUTTE, MONT.—The Butte Electric Railway Company is double-tracking its system in the city of Butte, at a cost of about $86,000.

ARCO, IDA.—An election will soon be held to vote on the proposal to issue $30,000 in bonds for extensions and improvements to the municipal light and power plant.

BOISE, IDA.—Beginning Oct. 1st, an increased schedule of gas rates has been allowed the Boise Gas Light & Coke Company by the Public Utilities Commission.

KALISPELL, MONT.—The Mountain States Power Company has a contract with the Great Northern Railway covering 25 h.p. in motors for the operation of a turn-table at the Whitefish round house.

RUGERT, IDA.—A retrial of the case between the Rupert Electric Company and twenty-five patrons of that company resulted in the reducing of rates by the Public Utility Commission and the ruling that $10 installation charges be refunded to consumers.

MISSOULA, MONT.—The Milwaukee Railway Company has received 30 cars of steel rails and angle irons at McNamara's landing for use on the Blackfoot branch line from Potomac to Clearwater. The line will be 22 miles long and approximately half of the material needed is on the ground.

PUEBLO, COLO.—Arkansas Valley Railway, Light & Power Company has been approached by a company organized in Colorado Springs, for the purpose of working manganese ores in the Cripple Creek district, with reference to supplying this company's electric energy requirements amounting to approximately 300 h.p. in motors.

LEWISTON, MONT.—The Cook County Transit Company, it is reported, is preparing plans for the construction of an electric railway from a point near Gardiner along the Yellowstone River to the Lamar River and Soda Butte Creek.

SALT LAKE CITY, UTAH.—Reporting for August and the twelve months ended August 31, 1918, the Utah Power & Light Company furnishes convincing evidence that considering the big increase in operating costs, it is more than holding its own. Its income for the year, after expenses are deducted, amounting to $312,198 more than that of the preceding year.

THE VACUUM CLEANER —— THE VACUUM CLEANER

PART OF THE FROSTING always gets left in the dish—and it is usually a coveted privilege among the children to be allowed to finish the plate. There is many a good thing which gets chipped off from the material which passes through these pages and drifts about unused to end up in a dusty corner. It is just these odds and ends which the vacuum cleaner picks up—and in the interest of conservation presents them here. The editors disclaim all responsibility for this page which is entirely in the hands of The Office Vacuum Cleaner.—The Editor.

Exact to a T is the version of Albert Elliot's last name shown beneath him here. The picture was taken in Pasadena and the name was placed on the curb to identify a street in the residence section of that city and does not refer to the golf playing of the secretary of the Pacific Division of the Electrical Supply Jobbers' Association. Like Garnett Young and some others of the electrical fraternity, Albert's name is to be spelled both doubly and singly with respect to its t's—and up to recently he has been very particular that it possess but one. However, since a recent difficulty in determining the exact name of one of the numerous societies of which he is secretary (the Journal of Electricity called him up to be sure and had to change its columns three times to meet his verdicts), he has evidently had his doubts. At least, his recent stationery is headed by a name spelt with two final t's. The only recourse now seems to be to get an ordinance through revising the name of the street in Pasadena.

The needle in the noodle soup was excused as a typographical error by the waiter with a past record in a printing establishment. There is not a periodical in existence which has not had an explanation to make on this count at some time during its history. The mind supplies what is lacking to the eye and errors will creep in. Familiar to those who read proof and occasionally to readers of the finished product is the pi-ed line which takes the form of a certain sequence of letters in the order in which they appear on the keyboard of the linotype machine. Such a one is the mystic "Etaoin, etaoin" with which the operator fills up a line he intends to scrap. "Shrdlu" is the second combination. But here they are, set to verse by the clever writer of the humorous column in the little Oregon Voter:

ODEFFLFFLFFI!!

The gray clouds trail across the blue,
Gray, as my heart is gray today;
Dull ghosts that drive shrdlu, shrdlu
shrdlu, shrdlu and fade away.

Ashen of cheek and pale of lip
I murmur of the hope that's gone,
And whisper with a wild cmfwyp:
"Alas! Etaoin, etaoin, etaoin!"

For the good of the cause a half page of the London Electrical Review is fortnightly made available, through the courtesy of an advertiser, for the publication of verses or other matter which, as they phrase it "may be of use in helping some of us to realize the present urgent needs of our beloved country." Here is one of the recent contributions:

NO. 16 — THE DAMPHOOL

An Enemy is one who, by chance of birth, is fighting against us. If we capture him we send him to an internment camp and treat him well, considering the conditions. When the war is over we return him to his country, and are rather proud of the good care we took of him.

A Spy is an enemy working surreptitiously for his country's cause in our midst. If we capture him, we shoot him—or ought to.

A Traitor is one of our own who aids and abets the enemy. If we catch him, we shoot him—or ought to.

A Slacker is one of our own who ,though he prefers that we win, declines to do his part. If we catch him, we give him about twenty years at hard labor—or ought to.

A Damphool is one of our own who goes about preaching false doctrines, and doing inestimable harm by lowering the morale of his fellow countrymen, and by encouraging the enemy to hold out longer in the hopes of a German Peace. The law so protects the Damphool that we are not even permitted to kick him where his licence tag would be if he were an automobile instead of a fool.

It will thus be seen that we have ample protection against the Enemy, the Spy, the Traitor, and the Slacker, but no protection against the Damphool. He is therefore most dangerous, and we should take steps to muzzle him when we realize that most of the enemy's victories have been attributed to propaganda disseminated by Damphools, both in this and other countries, particularly Russia and Italy. The fact that Damphools have not sense enough to know they are being used by the enemy does not mitigate the enormous harm they do.

September, 1918. —Extracted from "The Houghton Line."

There is one spot in America which cannot be reached by land without going through foreign territory. No, it is not Alaska, nor Hawaii nor the Philippines, and there is no catch to the question. It is a little corner of Minnesota which extends up into Canada and cuts into the province of Manitoba. By some freak of the boundary commission which finally determined the line, the Canadian-United States boundary here follows the parallel of latitude up to the shore of the Lake of the Woods. From this point it follows the southerly shore of the lake, except for a small corner of land toward the center of the Canadian shore which is part of Minnesota. It is thus possible to cross the lake by row boat and still remain, by a species of Irish bull, always on American territory. But to reach the district by land from either direction means crossing the border twice. The country is beautifully wooded and a favorite for summer camping.

The third of our electrical beasties is a warm-hearted individual although she looks cross enough as pictured here. But there is no danger, for apparently she is muzzled like the rest of us these days.

THE ELECTRIC HEATER

Here behold the electrical heater,
For hot air 'twould be hard to beat her.
Though her ardor's absurd
She's as good as her word
And of fuel an abstemious eater.

THE VACUUM CLEANER —— THE VACUUM CLEANER